IN THE UNITED STATES DISTRICT COURT
FOR THE DISTRICT OF DELAWARE

RONALD A. KATZ TECHNOLOGY LICENSING, L.P., Plaintiff, v. TD BANKNORTH INC.; EXPERIAN INFORMATION SOLUTIONS, INC.; COMERICA INCORPORATED; COMERICA BANK & TRUST, NATIONAL ASSOCIATION; COMERICA SECURITIES, INC.; CERIDIAN CORPORATION; COMDATA CORPORATION; DILLARD'S, INC.; DILLARD INVESTMENT CO., INC.; LASALLE BANK CORPORATION; LASALLE BANK NATIONAL ASSOCIATION; LASALLE FINANCIAL SERVICES, INC.; ABN AMRO MORTGAGE GROUP, INC., Defendants.	)	C.A. No. _____ **DEMAND FOR JURY TRIAL**

APPENDIX OF PATENTS TO PLAINTIFF RONALD A. KATZ TECHNOLOGY LICENSING, L.P.'S COMPLAINT FOR PATENT INFRINGEMENT

OF COUNSEL:

Robert T. Haslam
Andrew C. Byrnes
HELLER EHRMAN LLP
275 Middlefield Road
Menlo Park, CA 94025-3506
650.324.7000

Michael K. Plimack
Dale A. Rice
HELLER EHRMAN LLP
333 Bush Street
San Francisco, CA 94104-2878
415.772.6000

MORRIS, NICHOLS, ARSHT & TUNNELL LLP
Mary B. Graham (#2256)
Julia Heaney (#3052)
Benjamin J. Schladweiler (#4601)
1201 N. Market Street
P.O. Box 1347
Wilmington, DE 19899-1347
302.658.9200

Attorneys for Plaintiff
Ronald A. Katz Technology Licensing, L.P.

Dated: September 1, 2006

TABLE OF PATENTS

EXHIBIT 1

United States Patent [19]

Katz

[11] **Patent Number: 4,792,968**

[45] **Date of Patent: Dec. 20, 1988**

[54] **STATISTICAL ANALYSIS SYSTEM FOR USE WITH PUBLIC COMMUNICATION FACILITY**

[75] Inventor: **Ronald A. Katz**, Los Angeles, Calif.

[73] Assignee: **FDR Interactive Technologies**, New York, N.Y.

[21] Appl. No.: **18,244**

[22] Filed: **Feb. 24, 1987**

Related U.S. Application Data

[63] Continuation-in-part of Ser. No. 753,299, Jul. 10, 1985, abandoned.

[51] **Int. Cl.**[4] **H04M 11/06**

[52] **U.S. Cl.** **379/92**; 379/67

[58] **Field of Search** 379/91, 67, 92, 110; 235/377, 375

[56] **References Cited**

U.S. PATENT DOCUMENTS

3,393,272	7/1968	Hanson	379/67
3,934,095	1/1976	Mathews et al.	379/67
4,017,835	4/1977	Randolph	235/379
4,290,141	9/1981	Anderson et al.	455/2
4,320,256	3/1982	Freeman	379/92
4,345,315	8/1982	Cadotte, et al.	364/900
4,355,207	10/1982	Curtin	379/67
4,355,372	10/1982	Johnson et al.	364/900
4,439,636	3/1984	Newkirk et al.	379/91
4,451,700	5/1984	Kempner et al.	379/88
4,489,438	12/1984	Hughes	381/51
4,521,643	6/1985	DuPuis et al.	379/92
4,523,055	6/1985	Hohl et al.	379/89
4,539,435	9/1985	Eckmann	379/93
4,559,415	12/1985	Bernard et al.	379/91
4,566,030	1/1986	Nickerson	358/84
4,578,700	3/1986	Roberts et al.	358/84
4,584,602	4/1986	Nakagawa	358/84
4,587,379	12/1986	Masuda	379/91
4,603,232	7/1986	Kurland et al.	379/92
4,625,276	11/1986	Benton	364/408
4,630,200	12/1986	Ohmae et al.	364/405
4,630,201	12/1986	White	364/408
4,634,809	1/1987	Paulsson et al.	379/91
4,654,482	3/1987	DeAngelis	379/95
4,674,044	6/1987	Kalmus et al.	364/408
4,696,029	9/1987	Cohen	379/92
4,697,282	9/1987	Winter et al.	379/67

FOREIGN PATENT DOCUMENTS

52-17740	2/1977	Japan	379/91

OTHER PUBLICATIONS

"Voice Mail", *Sound & Communications*, vol. 28, No. 2, 4/83, pp. 84–85.

J. Svigals, "Low Cost Point-of-Sale Terminal", IBM Technical Disclosure Bulletin, vol. 25, No. 4, Sep. 1982.

Goran Erikson, et al., "Voice and Data Workstations and Services in the ISDN", 1984.

A. Turbat, "Telepayment and Electronic Money, The Smart Card", 1982.

V. Scott Borison, "Transaction—Telephone Gets the Facts at the Point of Sale", Bell Laboratories Record, vol. 53, No. 9, Oct. 1975.

M. Demeautis et al., "The TV 200, A Transactional Telephone".

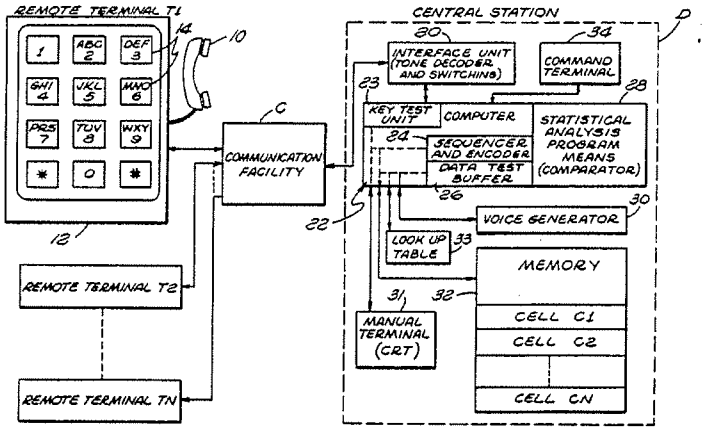
Primary Examiner—Robert Lev

Attorney, Agent, or Firm—Nilsson, Robbins, Dalgarn, Berliner, Carson & Wurst

[57] **ABSTRACT**

For use with a public communication facility C incorporating terminals T1–TN, e.g. a telephone system, a statistical analysis system D interfaces with individual stations where a caller is prompted by voice instructions to provide digital data that is identified for positive association with the caller and is stored for processing. Caller data is confirmed by a look-up table and by a signal-commanded voice generator. Files are created in the analysis system wherein callers are assigned designations which are stored along with statistical and identification data. In one embodiment, callers are identified by calling sequence and assigned designations are provided in the form of an acknowledgment. A break-off circuit enables a caller to terminate the computer interface aborting to a terminal for direct communication with an operator. The stored data is statistically processed and correlated as with established data to isolate a select group or subset of the callers or caller data that can be readily identified and confirmed.

12 Claims, 4 Drawing Sheets



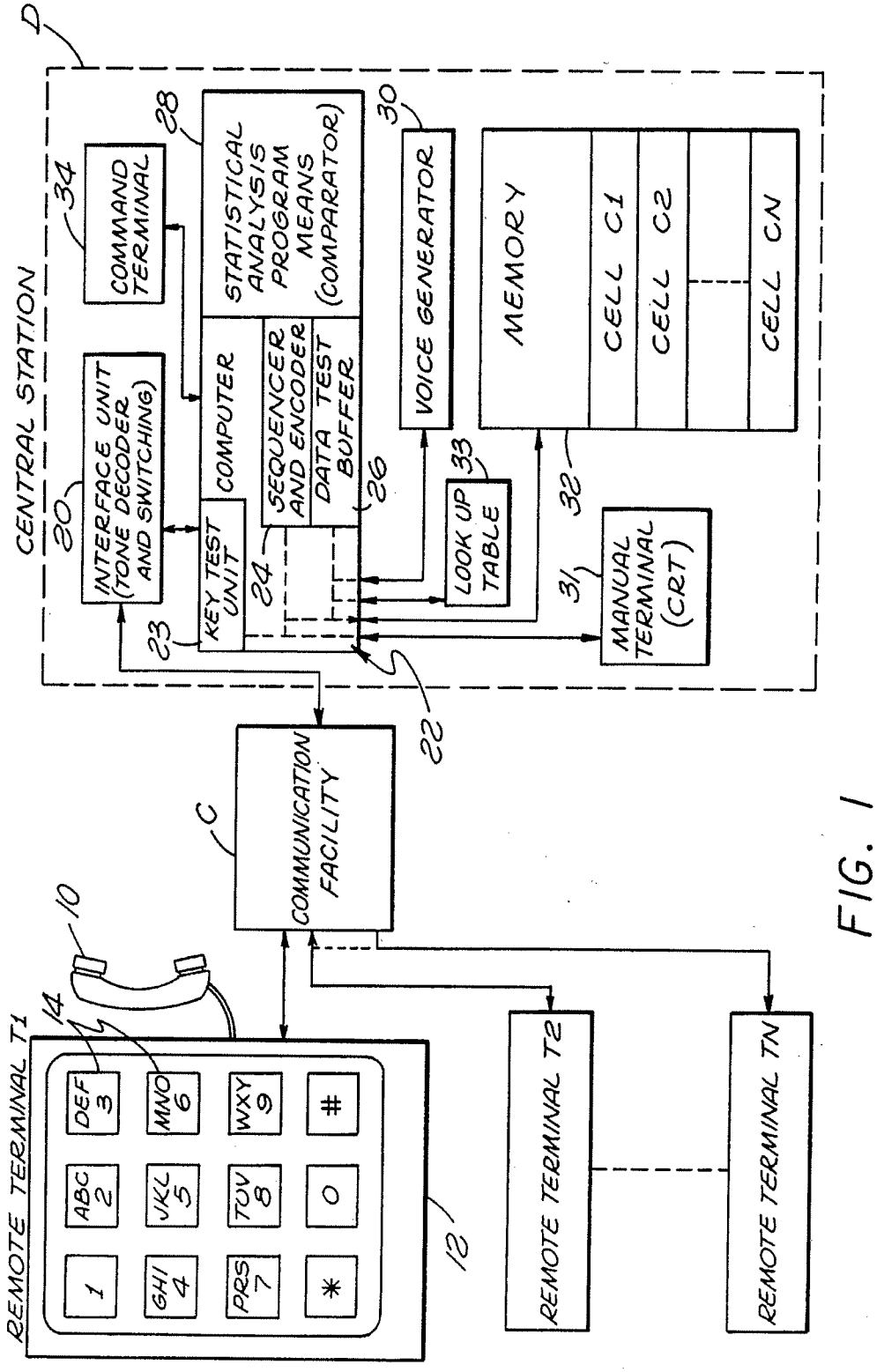

D
CENTRAL STATION
COMMAND TERMINAL
34
28
STATISTICAL ANALYSIS PROGRAM MEANS (COMPARATOR)
30
VOICE GENERATOR
MEMORY
CELL C1
CELL C2
CELL CN
INTERFACE UNIT (TONE DECODER AND SWITCHING)
20
COMPUTER
SEQUENCER AND ENCODER
DATA TEST BUFFER
26
KEY TEST UNIT
24
23
LOOK UP TABLE
33
32
31
MANUAL TERMINAL (CRT)
22
C
COMMUNICATION FACILITY
10
14
REMOTE TERMINAL T1
DEF 3
MNO 6
WXY 9
#
ABC 2
JKL 5
TUV 8
0
1
GHI 4
PRS 7
*
12
REMOTE TERMINAL T2
REMOTE TERMINAL TN

FIG. 1

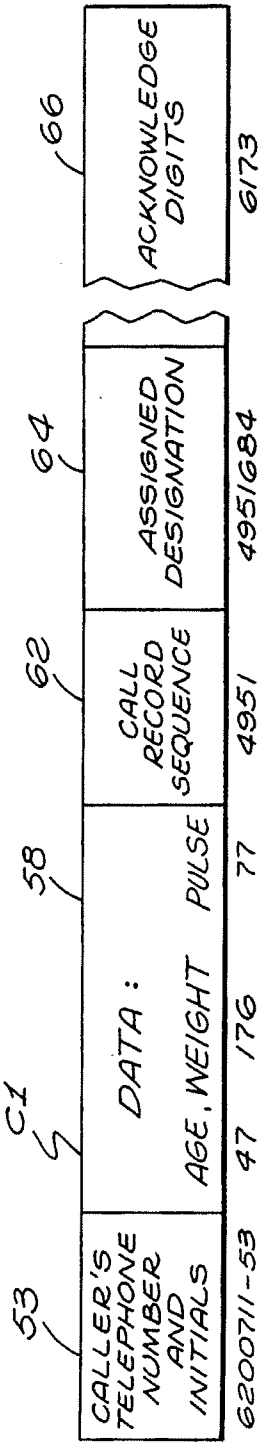

53
CALLER'S TELEPHONE NUMBER AND INITIALS
C1
58
DATA :
AGE, WEIGHT
PULSE
62
CALL RECORD SEQUENCE
64
ASSIGNED DESIGNATION
66
ACKNOWLEDGE DIGITS
6200711-53
47
176
77
4951
495/684
6173

FIG. 2

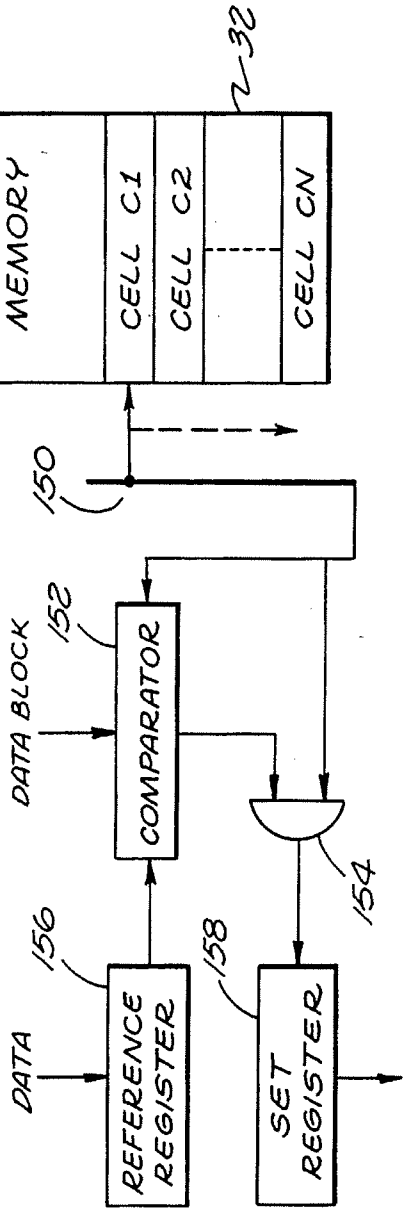

32
MEMORY
CELL C1
CELL C2
CELL CN
150
DATA BLOCK
152
COMPARATOR
154
DATA
156
REFERENCE REGISTER
158
SET REGISTER

FIG. 6

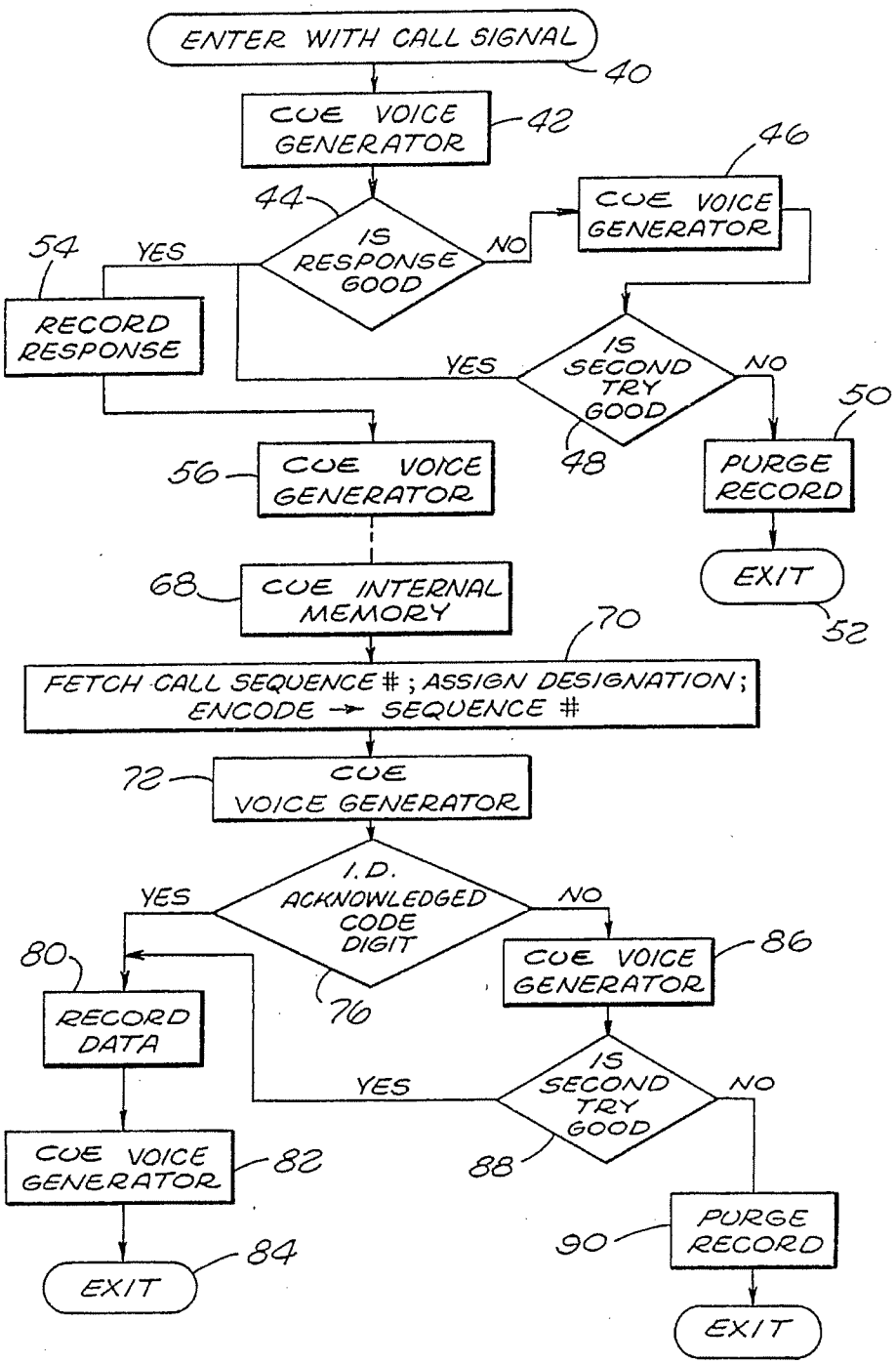

ENTER WITH CALL SIGNAL
40
COE VOICE GENERATOR
42
44
IS RESPONSE GOOD
YES
NO
46
COE VOICE GENERATOR
54
RECORD RESPONSE
IS SECOND TRY GOOD
YES
NO
48
50
PURGE RECORD
EXIT
52
56
COE VOICE GENERATOR
68
COE INTERNAL MEMORY
70
FETCH CALL SEQUENCE #; ASSIGN DESIGNATION; ENCODE → SEQUENCE #
72
COE VOICE GENERATOR
I.D. ACKNOWLEDGED CODE DIGIT
YES
NO
76
80
RECORD DATA
86
COE VOICE GENERATOR
IS SECOND TRY GOOD
YES
NO
88
COE VOICE GENERATOR
82
EXIT
84
90
PURGE RECORD
EXIT

FIG. 3

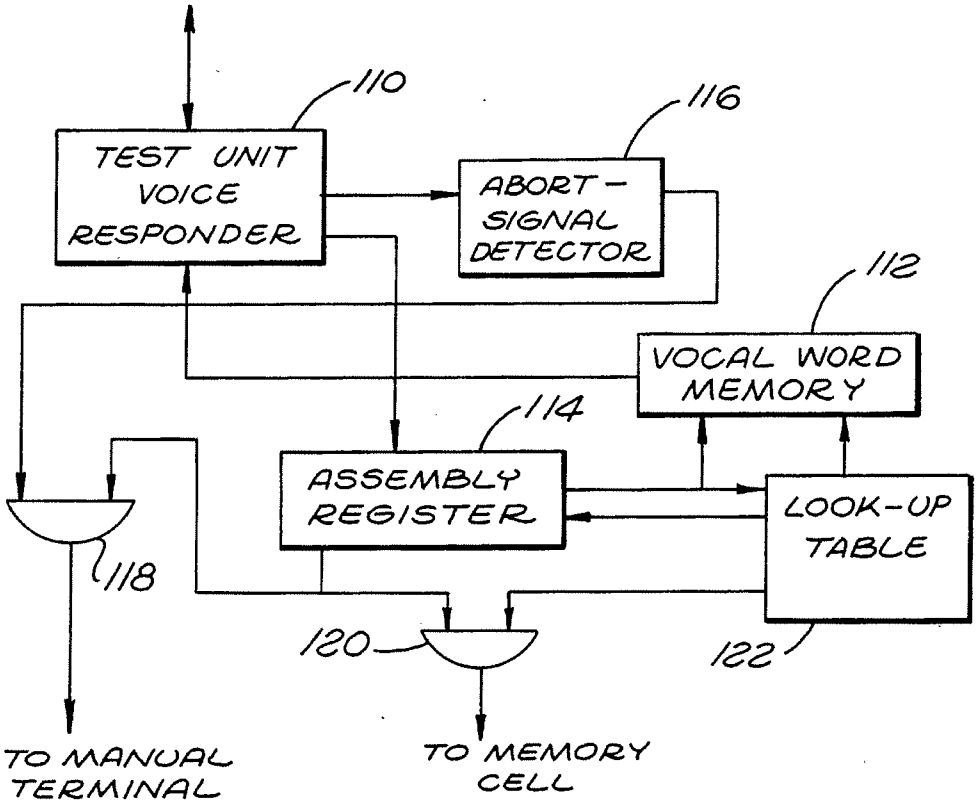

110
TEST UNIT VOICE RESPONDER
116
ABORT-SIGNAL DETECTOR
112
VOCAL WORD MEMORY
114
ASSEMBLY REGISTER
LOOK-UP TABLE
118
120
122
TO MANUAL TERMINAL
TO MEMORY CELL

FIG. 4

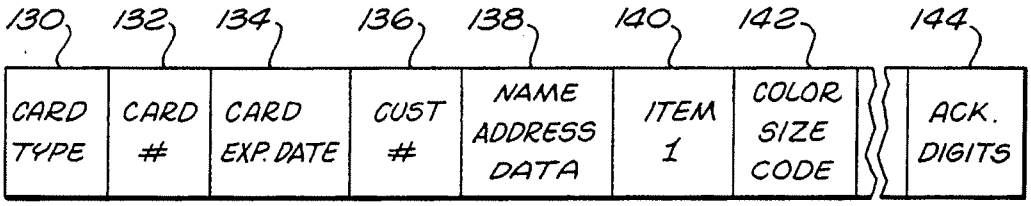

130
132
134
136
138
140
142
144
CARD TYPE
CARD #
CARD EXP. DATE
CUST #
NAME ADDRESS DATA
ITEM 1
COLOR SIZE CODE
ACK. DIGITS

FIG. 5

STATISTICAL ANALYSIS SYSTEM FOR USE WITH PUBLIC COMMUNICATION FACILITY

BACKGROUND AND SUMMARY OF THE INVENTION

This is a continuation-in-part of application Ser. No. 753,299 filed July 10, 1985 and entitled "Statistical Analysis System for Use With Public Communication Facility" now abandoned.

Various forms of public polling have come into widespread use. Telecommunications afford a valuable tool for such activity. To some extent, telecommunication polling has been automated, particularly with regard to specific test groups. However, sometimes it is desirable to perform analysis to identify specific selections with respect to very large groups of people who are not preselected for use in an organized calling campaign. For example, it may be desirable to obtain medical data from a large group of people, to correlate such data, then to identify a select subset of the group using some external data. Also, it may be desirable to collect such medical data selectively from people who have purchased a test kit or the like for obtaining data. In any event, a need exists for an effective, economical, and expedient system for performing such analysis and selection.

It has been proposed to use telecommunications systems to interface control systems with individuals who provide digital identification data by actuating a digital mechanism. For example, it has been proposed to interface individuals at telephone calling stations with recorded voice messages prompting the provision of address data by actuating the numeric or alphabetic buttons that are conventionally employed for dialing another telephone station. In general, such techniques have been used to provide specific select information. For example, a caller might actuate dialing buttons to selectively address specific information in a computer of interest to him. In another arrangement, dialing buttons may be actuated to specify a billing designation as for requested services. In the course of such operations, difficulties sometimes arise which are frustrating or confusing to a caller and may ruin the communication. Nevertheless, such techniques offer enhanced possibilities and in general the system of the present invention is based on the recognition of certain of those possibilities.

Telecommunications also have come into widespread use with respect to merchandising. Specifically, for example, most mail-order organizations have telecommunications facilities, some of which may be automated to a limited extent. Television merchandising operations also often involve the supplemental use of the telephone. Accordingly, a need exists to improve telecommunication facilities for such operations with respect to economy, convenience and reliability.

In general, the present invention compiises a system of analysis, selection and data processing for operation in cooperation with a public communication facility, e.g. a telephone system. A voice origination or organization apparatus prompts individual callers to provide select digital data to develop a record for further processing. If appropriate, abort capability allows a caller to interface directly with an operator. A control system may qualify a caller then provide data cells for storing individual data and assigning definitive identifications to such data (and to the caller) and for testing such data, as for the selection of a subset of calless. A variety of

memory techniques are used to selectively activate the voice origination apparatus. Accordingly, statistical analysis and selection can be effectively accomplished economically with respect to a substantially unlimited set of callers who are accommodated by a public communication system. In a related aspect, callers can provide data as for merchandising, or various other telecommunications operations involving a large number of persons and a large volume of data.

BRIEF DESCRIPTION OF THE DRAWINGS

In the drawings, which constitute a part of this specification, exemplary embodiments exhibiting various objectives and features hereof are set forth, specifically:

FIG. **1** is a block diagram of a system constructed in accordance with the present invention;

FIG. **2** is a fragmentary diagrammatic representation of a storage cell as may be formatted in the system of FIG. **1**;

FIG. **3** is a flow diagram of one operating format of the system of FIG. **1**;

FIG. **4** is a block diagram of a form of key test unit as may be employed in the system of FIG. **1**;

FIG. **5** is a fragmentary diagrammatic representation of another storage cell as may be formatted in the system of FIG. **1**; and

FIG. **6** is a block diagram of a form of analysis means as may be employed in the system of FIG. **1**.

DESCRIPTION OF THE ILLUSTRATIVE EMBODIMENT

As required, a detailed illustrative embodiment of the present invention is disclosed herein. However, physical communication systems, data formats, and operating structures in accordance with the present invention may be embodied in a wide variety of forms, some of which may be quite different from those of the disclosed embodiment. Consequently, the specific structural and functional details disclosed herein are merely representative; yet in that regard, they are deemed to afford the best embodiment for purposes of disclosure and to provide a basis for the claims herein which define the scope of the present invention.

Referring initially to FIG. **1**, a series of remote terminals T1 through TN are represented (left). The terminals are generally similar, and accordingly, only the terminal T1 is illustrated in detail. In the disclosed embodiment, the remote terminals T1 through TN comprise various telephone terminals coupled to a communication facility C which may take the form of a comprehensive telephone system for interconnecting any associated terminals. The communication facility C is also coupled to a data development central station D in accordance herewith, an embodiment of which is illustrated in some detail.

Generally in accordance with the present development, individual callers use the individual telephone stations T1 through TN to interface the data development station D through the communication facility C. Also in accordance herewith, the data of individual callers is collected and correlated in the data station D for processing in accordance with external data. As a consequence, various objectives are accomplished. For example, a select subset of the callers may be isolated and specifically identified, or related data may be processed, or transactions may be actuated. The possibili-

ties are substantial and varied as will be apparent from the exemplary functions as described in detail below.

As indicated, several polling, actuating, marketing or informing operations can be accomplished utilizing systems in accordanee herewith. For example, the public might be polled with regard to locating the specific purchasers of a defective and dangerous product. The public might be polled with the objective of locating persons susceptible to a specific ailment or disease. In a less serious vein, but one of particular commercial significance, the system also might be employed in various public communication game formats or, where legal and deemed in the public welfare, public lotteries. The system also might be used to automate a mail-order operation, even to the extent of inventory control as detailed below.

Considering the system of FIG. **1** in somewhat greater detail, it is to be understood that the communication facility C has multiplexing capability for individually coupling the terminals T1–TN to the central station C on request. In the illustrative form of the system, the communication facility C comprises a public telephone facility and the individual terminals T1–TN take various forms of existing telephone instruments. In that regard, the telephone terminal T1 is represented in some detail to include a hand piece **10** (microphone and earphone) and a panel **12** provided with a rectangular array of push buttons **14** in the conventional configuration.

In accordance with conventional telephone designations, alphabetic and numeric designations are provided on the buttons **14**. For example, several of the buttons **14** carry three letters along with a decimal numeral. Specifically, the button designated with the numeral "2" also carries the letters "A", "B" and "C". In that manner, the buttons **14** encompass the numerals "0–9", two symbols, and the alphabet except for the letters "Q" and "Z". Consequently, the buttons **14** accommodate entry of decimal data along with a wide range of alphabetic data. In that regard, the buttons **14** designated with symbols "*" and "#" as well as the numeral "0" can be used by predetermined assignment to represent the letters "Q" and "Z" or any of a variety of other data or commands. Generally, in accordance herewith, the buttons **14** are employed to formulate digital data at the central station D in various formats determined by the curret specific use and operating format of the system.

Considering the central station D in somewhat greater detail, the communication facility C is coupled to an interface unit **20** which incorporates modems, tone decoders, and switching mechanisms. The interface unit **20** affords couplings to a computer **22** which may take the form of a mini-unit programmed for example in accordance with the functions as set forth below. Generally, the computer **22** performs several distinct and separate operations. Specifically, the computer **22** may initially qualify a caller. In that regard, if a select group of callers are to have access to the system, a portion of the computer **22** designated as a key test unit **23** qualifies individual callers who present a key number. An exemplary detailed embodiment of the key test unit **23** is described below.

With clearance of a caller by the key test unit **23**, the system enters a further data acquisition phase with respect to that caller. Specifically, the computer **22** receives detailed data from a caller at any one of the individual stations T1–TN (through the communication facility C) which data is organized, tagged to be identified, and stored. Tests and confirmations may be performed during this phase of operation. Thereafter, during a processing phase, the computer **22** processes the stored data. For example, the processing may involve applying additional data to isolate a select subset of callers. Such data may or may not have been available during all or a portion of the data-gathering period.

Sub-blocks of the computer **22**, in addition to the test unit **23**, also are illustrated in the block designating other components of the computer **22** actually to represent various internal component operating structures. In formulating the data records to be stored, the computer **22** employs logic operations which are performed by a sequencer and encoder **24**. During statistical processing operations, the computer **22** utilizes a data test buffer **26** along with a statistical analysis program means **28**. Exemplary operations and formats for these elements are treated below.

The computer **22** is connected to a voice generator **30**, a manual terminal **31**, a memory **32** and a look-up table **33**. Note that these components are illustrated separately from the computer **28** for purposes of simplified explanation. The voice generator **30** functions to selectively provide voice messages through the interface unit **20** and the communication facility C to currently active remote terminals. The manual operating terminal **31**, located at the central station D, communicates with the computer **22**. In the context of the present invention, the manual terminal **31** is activated at a time when it is desirable to abort automated data processing operation as described in detail below. Finally, in the illustrative embodiment, the computer **22** is coupled to the memory **32** containing a plurality of individual cells C1–CN which are employed to register the data from individual callers at the terminals. During data accumulation phases, the apparatus at the central station D acquires data in the memory **32** utilizing individual cells C1–CN for the individual callers. Subsequently, during the statistical processing operation, the computer **22** receives data through a command terminal **34** which is tested with regard to the acquired data in the cells C1–CN of memory **32** so as to select and identify a subset of the individual callers or define action with respect to callers. Thus, the system is effective for use in statistical polling or merchandising to selectively identify a particular subset of data associated with a subset of individual callers and define associated action. In that regard, often it is important to positively identify the isolated subset of callers and also to enable those callers to verify their identity in association with the data. The system of the present invention accommodates those needs.

An appreciation of the philosophical operation of a system in accordance with the present invention may now be enhanced by considering an exemplary operation of the illustrative embodiment of FIG. **1** to isolate a subset of people who are susceptible to a particular disease or infirmity. The exemplary operation might involve a geographical area, as a large city, in which a particular health problem is somewhat acute. For example, a major population center where coronary artery disease is a significant problem might be polled. Accordingly, persons most susceptible to such disease could be identified for corrective recommendations or measures.

As an alternative example related to health, the system may process the resultant data from test kits. Specifically, test kits might be sold to concerned persons who would use the kit to obtain certain specific health

data. For example, a person might purchase a kit containing the apparatus and instructions to perform various non-invasive procedures to obtain data that could indicate a health condition, e.g. pregnancy. The kit containing the apparatus could also include a key number for qualifying the purchaser to access the computer **22**. The qualification would be performed by the key test unit **23** (described in detail below) which might simply incorporate a look-up table to check off key numbers as they are used or "consumed". With qualification, a caller could be instructed in detail and statistical data could also be acquired.

Returning to the example of generally polling a population center, people of the metropolitan area could be informed of the availability of a service for statistical health analysis. Accordingly, persons interested in their individual statistical situation would be motivated to utilize the service. Specifically, individual callers would use the remote terminals T1–TN to contact the central station D through the communication facility C and thereby provide personal information which would enable a statistical analysis in relation to existing data so as to isolate and inform those persons statistically most likely to be in need of corrective measures. In such applications, it may be important that the caller's identity be subject to reliable verification. Other applications also may present a critical need for positively verifiable identification to the extent that credit card numbers and/or personal identification numbers may be employed.

An exemplary operation of the system, with regard to a specific caller, will now be treated referring somewhat concurrently to FIGS. **1**, **2** and **3**. As indicated above, FIG. **2** indicates a data storage format and now will be considered with regard to a format in which data is composed for a caller in one of the cells C1–CN of the memory **32**.

Pursuing the above example in accordance with the assumptions, further assume the existence of a caller at the remote terminal T1 who wishes to pursue health-related information on the basis of statistical analysis. The caller lifts the hand piece **10** and in accordance with conventional techniques actuates the push buttons **14** to establish communication through the facility C with the central station D. Upon receiving the call signal, the interface unit **20** (central station D, FIG. **1**) actuates the computer **22** to cue the voice generator **30**. The sequence of operations is represented to be initiated in FIG. **3** by the "enter" block **40** which is accordingly followed by a "cue voice generator" command block **42**. Accordingly, the voice generator **30** (FIG. **1**) formulates speech, a representative form of which might be: "Thank you for participating in the coronary artery disease statistical analysis. Please give us your telephone number by actuating the call buttons on your telephone instrument."

Acting on the instructions the caller would push the buttons **14** in sequence to indicate his telephone number, e.g. "6200711". This data could be taken directly from the system as it is available in certain telephone apparatus of the facility C. The time of day also could be taken. The resulting data signals are communicated to the interface unit **20** (FIG. **1**) then applied to the computer **22** for testing as a valid telephone number. Note that the number can be tested by the look-up table **33** (FIG. **1**) as separately illustrated. Essentially, the format of a proper number prompts the look-up table to produce a valid or "good" signal. The test is indicated by the block **44** (FIG. **3**). If the response is not valid, for example contains an inappropriate number of digits, the operation of block **46** is initiated again cuing the voice generator **30** (FIG. **1**). Accordingly, the voice generator reinstructs the caller, e.g.: "You have not entered a proper telephone number. Please reenter your telephone number by pressing the appropriate call buttons."

The caller is then allotted a predetermined period of time to make a proper entry with the consequence that the system move to a test operation as indicated by the block **48** (FIG. **3**). Specifically, block **48** poses the query: "Is the second try good?"

If the caller is again unsuccessful, the system purges the record as indicated by the block **50** and the call is terminated as indicated by the block **52**. In an alternative mode, the computer **22** may abort the interface and couple the manual terminal **31** for communication with the caller. The interchange would then proceed, person-to-person.

If the caller responds with a proper telephone number, the operation proceeds. Specifically, the system sequences to record the response of the proper telephone number as indicated by the block **54**. That is, the caller's telephone is recorded in a specific cell C1–CN identified with the caller. The format of the cell C1 is indicated in FIG. **2**. The first portion, section **53**, contains the caller's telephone number, i.e. "6200711". Note that as explained above, if the second attempt to formulate a proper number is successful, as manifest by the block **48** (FIG. **3**), the response is recorded at that stage. In either case, exiting from the block **54** (FIG. **3**) invokes the next operation of again cuing the voice generator as indicated by the block **56**.

As an alternative, if a selective-group polling operation is performed, as mentioned above, the caller is qualified by providing the "one-time" key number included in his package. As indicated above, the unit **23** may incorporate a look-up table for proper key numbers. Proper numbers may be coded using any of a wide variety of techniques. As a simple illustrative example, the key may comprise a precise number of digits that always total a particular numerical value.

The key test unit **23** performs the test as an initial qualification. Next, the unit **23** verifies that the key given by a caller has not been consumed by prior use. Thus, the unit **23** may simply incorporate some arithmetic test capability along with a look-up table as well known in the art.

Returning to the detailed example, the system proceeds after the caller is qualified. Specifically, the cue to the voice generator **30** (FIG. **1**) as represented by the block **56** produces a request for further information from the caller. For example, the voice generator might request information by stating: "Please use the telephone buttons to indicate the initials of your first and last names using the asterisk button for the letters Q and Z."

The detailed operation is not represented in FIG. **3** as it is similar to the operation illustrated by the blocks **42** through **54**. However, again, a proper response is registered in the storage cell C1 as illustrated in FIG. **2** by the number "53" also registered in the first section **53** of the cell.

The cycle of obtaining digital information from the caller next is repeated with respect to substantial specific health data. For example, as illustrated in FIG. **2**, the next section **58** in the cell C1 receives an accumula-

tion of health data, including the caller's age, weight, . . . , pulse rate, and so on. Representative digital numbers are illustrated in FIG. 2.

During the course of the telephonic communication, the computer 22 formulates identification data for the caller specifically including: the chronological sequence of the call, the assigned designation of the call, and a set of acknowledgment digits for the call. Such data identification is registered in the assigned cell C1 in accordance with the format of FIG. 2 being stored in sections 62, 64 and 66. Note that the data may be stored in a coded interrelationship. For example, the acknowledgment digits may be related to the call record sequence. In the illustrative example, the chronological order number of the caller is 4951. The acknowledge digits may be derived from the sequence number. For example, as illustrated, a coded relationship may be established by adding "two" to each of the individual record sequence digits. Considering the example numerically:

$$\begin{array}{r} 4951 \\ \underline{2222} \\ \text{Adding without carries: } 6173 \end{array}$$

According to the example, the call chronological sequence registered for the caller is 4951 as represented in the section 62 while the acknowledge digits are 6173 as registered in the section 66. Additionally, the computer develops an assigned designation number, e.g. designation "4951684", which is registered in the section 64 and an acknowledge code or digits, e.g. 6173, registered in the section 66. These values are formulated in accordance with conventional number techniques during the data acquisition phase. Specifically, with the exemplary numerals formulated, the operation proceeds.

The computer 22 (FIG. 1) cues the internal memory. That operation is indicated by the block 68 (FIG. 3). Thus, the computer 22 fetches the call record sequence number, assigns a designation (if not previously assigned), and encodes the sequence number as the acknowledgment digits (if not previously accomplished). These operations are indicated by the block 70 (FIG. 3). Next, the computer 22 (FIG. 1) cues the voice generator as indicated by the block 72 (FIG. 3) to provide information to the caller. Specifically, for example, the voice generator 30 (FIG. 1) might state: "This transaction has been designated by the number 4951684, and is further identified by the acknowledgment digits 6173. Please make a record of these numbers as they will be repeated. Specifically, the designation number is 4951684. The acknowledgment digits are 6173. Please acknowledge this transaction by pressing your telephone buttons to indicate the acknowledge digits 6173." In various applications as those involving security, the order and acknowledgment of callers may be very important. Therefore, data for confirmation associated with the order is important.

The system next assumes a test mode as indicated by the block 76 (FIG. 3). If the caller provides the correct acknowledgment digits, the data is confirmed in the record as indicated by the block 80 and registered in the cell C1 (FIG. 2). Additionally, the voice generator 30 (FIG. 1) is sequenced as indicated by the block 82 (FIG. 3) to indicate the close of the communication and that the transaction is terminated as represented by the exit block 84.

In the event that the caller cannot confirm his acknowledgment digits, as indicated by the block 76, a repeat operation is performed as indicated respectively by the blocks 86 and 88. Specifically, the voice generator 30 (FIG. 1) is cued for a second instructional message. In the event that the second attempt also fails, the data is purged and the call discounted as indicated by block 90. If the second try is successful (test block 88), as indicated by the block 80, the record is perfected as indicated above.

As a result of the likelihood of a large number of calls, as described above, the data cells C1–CN in the memory 32 (FIG. 1) are developed with specific information indicative of a statistical sampling of the populace of concern. The data of that statistical sampling may be self-generating of specific conclusions with respect to a subset of individuals, and/or supplemental data may clearly manifest a significant subset. For example, the data may indicate a significant departure from an assumed normal characteristic. Such data, accumulated from the polling, may be considered by logic comparisons in the computer 22 to select the subset of persons who should be isolated.

In addition to the self-generating conclusions available from the received data, the system may involve the introduction of external data. In the physical fitness example, such external data might take the form of national statistical data. In any event, the processing operation usually involves comparison tesiing which compares caller data from individual cells C1–CN with test data that is supplied to the statistical analysis program means 28 through the command terminal 34.

As a simplistic example, health data including age, weight, . . . pulse, may be formulated into a composite number reflecting rated values for each of the data elements. Such a composite number may then be placed in the data test buffer 26 for sequential testing against similarly composed numbers formed from the data in the individual cells C1–CN. Based on such comparative testing, a subset of persons may be identified. Presumably those persons will be informed of their circumstances. Note that the command terminal 34 incorporates a display or other output data apparatus as standard in the art for manifesting the subset. Hoeever, it is important that identifications be confirmed as accurate. It is in that sense that the assigned designations as registered in the section 64 (FIG. 2) and the call record sequence, as registered in the block 62, are important. Note that multiple comparative processing operations may be desirable or necessary to isolate and confirm a subset of significant concern.

In the above example, members of the public were simply invited to use the service. A number of alternatives exist which might well impact on the statistical analysis. For example, callers might be restricted to the purchasers of a specific product as a medical apparatus for measuring blood pressures, heart rates, or so on. In such situations, it will be apparent that the statistical data will be somewhat distorted from an average or normal sampling. Clearly, the computer 22 can be programmed to take into account such considerations. In that regard, the computer 22 might also verify identification data proffered by a caller. Such data might take the form of a credit card number or a personal identification number. Various techniques for verification of

such numbers using computer techniques are well known and recognized in the prior art.

As indicated above, the system can be formatted for use in a variety of applications, including the automation of a mail order operation. Preliminary to considering an exemplary form of such an application, a disclosed embodiment of the key test unit **23** will be considered as illustrated in FIG. **4**. A test unit voice responder **110** (FIG. **4**, upper left) is coupled to the interface unit **20** (FIG. **1**). The voice responder **110** may be integrated with the voice generator **30** (FIG. **1**), or take the form of a separate unit. In any event, the responder functions as a channel or conduit for signals passing in and out of the unit and on command forms modulated voice signals to enunciate words in accordance with signals from a vocal word memory **112**.

As a signal channel, the responder supplies received signals to an assembly register **114** and to an abort signal detector **116**. The abort signal detector **116** may simply take the form of a decoder that is actuated to produce an abort signal on receiving a digital signal to manifest a specific binary code, e.g. the code word representative of the asterisk button (*) on the panel **12** (FIG. **1**). From the detector **116** (FIG. **4**) the abort signal is applied to an "and" gate **118**.

As indicated above, signals received by the responder are applied to the assembly register **114**. Signal data received by the register **114** is compiled. The data includes the preliminary information for a caller. That information is supplemented with additional data to complete a memory cell word as illustrated in FIG. **5**.

The register **114** is connected to supply its contents to the "and" gate **118** as well as a similar "and" gate **120**. Functionally, the gates **118** and **120** pass the contents of the assembly register **114** at the time when a qualifying signal is received. The gate **118** is qualified by the abort signal from the detector **116** and the gate **120** is qualified by a signal from a look-up table **122**.

Essentially, the look-up table **122** is indexed and addressed by the identification numbers of callers and responds with approval signals for the callers, if appropriate. The look-up table is also connected to supply disapproval signals to the vocal word memory **112**. oote that the memory **122** also is coupled to receive addressing signals from the register **114**.

Consider now the operation of the system of FIG. **1**, with the key test unit **23** as illustrated in FIG. **4** and with a system format to automate a mail order operation and assemble data in cells of the memory **32** as illustrated in FIG. **5**. Accordingly, assume that a caller establishes communication with the system as explained above.

As an initial preliminary action, the voice responder **110** might be cued to identify the mail order house and indicate that the order will be taken by computer. The caller also might be advised that if he prefers to communicate directly with a person, or needs such contact at any point in the communication, he may accomplish it simply by pushing the asterisk button (*) on his telephone. Alternatively, the customer may be asked by the voice generator **30** to provide (by voice) longer information as name, address, etc. which is recorded for later processing. Such action forms an abort signal that is detected by the detector **116** to qualify the gate **118**. As a result, the contents of the register is passed to the manual terminal **31** (FIG. **1**) with the command to take over the communication. If preliminary data has been assembled in the register **114**, such data will be displayed by a CRT of the terminal **31** to facilitate further communication.

After the preliminary information is supplied to a caller, the data collection phase is initiated. For example, the voice responder **110** might announce: "Please indicate the type of credit card you will use for your purchase by pushing the button number one for Mastercharge, two for . . . "

The caller's response, indicating a specific credit card, is stored in the register **114**, specifically in the first data block **130** as illustrated in FIG. **5**. The responder next instructs the caller to use the telephone buttons to indicate his credit card number and the expiration date of the card. That data is stored in the register **114**, specifically in the blocks **132** and **134** as illustrated in FIG. **5**. Similarly, in the disclosed embodiment, the caller is asked for his customer number, as it may appear on his catalog. That number is stored in a block **136** of the register **114**. Note that the caller may not be in the files of the mail order house and in that event, the operation may be shifted to a manual operation to be continued through the manual terminal **31** as explained above. For a television initiated mail order transaction, other numerical codes might be employed as to key into broadcast schedules. For example, a code might be used to indicate program times and thereby enable evaluation of the productivity of such program times.

To continue with the explanation of the automated format, assume that the customer has a number and that it is stored in the assembly register **114** along with his credit card number and expiration date. From that location, the data is checked for propriety as part of the initial test operation. The check or test is in two stages. First, the data is verified to be accurately registered by confirming it with the caller. Second, the data is verified as representing valid and proper data formats for the customer's number, the credit card number and expiration date. The test may also include a step of consulting a so-called negative list to assure that the identified card and customer's number have not been cancelled, as for example in the case of credit cards that have been lost or stolen.

To accomplish the first stage of verification, under control of the computer, the vocal word memory **122** is prompted to actuate the responder **110** to announce the registered data including the card number. Specifically for example, the memory **112** is addressed by the digits of the card number as stored in the register **114**. Accordingly, the memory **112** supplies mmodulated voice signals to the responder **110**. The mechanically stated message might be in a fixed format except for the card number, for example: "Please verify your card number as it will now be repeated. If the number is 2745273845957, please push the one button."

If incorrect numbers are stored in the register **114**, a corrective cycle may be sequenced as explained with respect to the first operating format. Also as explained above, with repeat failures, the communication may be terminated or the system may shift to a manual format by activating the terminal **31** (FIG. **1**) attended by an operator.

If the customer's number, card number and the expiration date are verified by the caller as correctly recorded in the register **114** (FIG. **4**), the operating sequence proceeds. Accordingly, the system proceeds with the next phsse of the test and checks the current propriety of the data in the register **114**. Under control of the sequencer **34** (FIG. **1**) the card type, number an

expiration date, along with the customer's number as contained in the register **114** (FIG. **4**) are supplied to the look-up table **122** for approval. A variety of different checks may be implemented in the table, depending on the nature of the system. In a minimal system, the table **122** verifies the propriety of the data simply as to form. In a more complex embodiment, the structure of the table **122** may include a negative list of unacceptable cards and customer's numbers. For still greater control, the structure of the table **122** might incorporate a memory for scoring transactions of individual card holders as with reference to time. Various structures and formats for such operations are well known in the credit verification and approval art.

In the disclosed embodiment, the look-up table **122** carries the full names and addresses of the customers. Accordingly, in response to the customer's number, the look-up table operates through the vocal word memory to activate the voice responder. Specifically for example, the responder might be activated to state: "Please confirm that your full name is John J. Jones by pressing the one button."Similarly, the address and any other pertinent mailing information is confirmed. With confirmation, the data is stored in the register **114**. Specifically, a block **138** (FIG. **5**) of the register **114** (FIG. **1**) receives the name and address data. Of course as explained above, difficulties might prompt either manual interface or termination of the communication.

With the successful completion and verification of all the preliminary data in the register **114**, the look-up table qualifies the "and" gate **120** transferring the contents of the register **114** (FIG. **4**) to a data cell in the memory **32** (FIG. **1**). Essentially, with the caller testing complete, the preliminary phase of operation is concluded and the system next interfaces with the caller to acquire and process data for a specific order of merchandise. That operation is performed by the structural components as illustrated in FIG. **1** to load a cell in the memory **32**.

Somewhat as described above in relation to the initial operating embodiment, the voice generator **30** prompts the caller through a series of exchanges that load the memory cell with a merchandise order. For example, the interchange might be as follows. The voice generator might instruct: "Please use the telephone number button to enter the item number of your purchase."

The caller might then enter the number "1124" which would be set in the data test buffer **26** and supplied to address the look-up table **33**. In response, the look-up table **33** would cue the voice generator **30** to announce: "That is item number 1124, a small white men's polo slipover cotton shirt at $11.95. If that is correct, please push the button one on your telephone. If it is not correct, push the button two and re-enter the item number."

The caller could confirm or reject the item. As items are confirmed, they are loaded from the buffer **26** to the designated cell in the memory **32**. With the registration of an item in the memory **32**, the caller is asked to indicate whether or not he wishes to order additional items. Accordingly, the cycle may be repeated. Of course, as explained above, at any stage the customer can abort the mechanical interface and establish personal communication with an operator at the terminal **31**. Also, some operating formats might automatically make the shift, as where the callers are all strange to the system and complex data must be registered as names and addresses.

As purchase items are confirmed, representative data is loaded into the assigned cell of the memory **32** as illustrated in FIG. **5**. Specifically, a series of storage blocks are loaded as exemplified by the blocks **140** and **142**. The interchange continues until the customer indicates he does not wish to order any additional items. The system then operates the voice generator **30** to announce the acknowledgement digits as stored in the block **144** (FIG. **5**) of the assigned data cell in the memory **32** (FIG. **1**). The acknowledgement digits serve to identify the order both for the caller and the mail order house. Accordingly, tracing is facilitated.

The individual cells of the memory **32** are processed to originate filling orders. In that regard, the statistical analysis program means **28** accumulates totals of specific items which are then utilized for inventory control. Specifically, comparisons can be performed between order totals, objective and existing inventories to generate lists for inventory adjustment. Thus, the system effectively analyzes acquired data to accomplish the desired objectives. To consider such analysis in somewhat greater detail, reference will now be made to the block diagram of FIG. **6**.

FIG. **6** functionally illustrates a component of the analysis means **28** (FIG. **1**) specifically for processing data to develop a related set. Generating a data set or subset with respect to any particular polling or data accumulation operation can be very significant. For example, in a polling operation it may be desirable to isolate specific sets or subsets of persons or subjects falling into a specific category as explained above. With respect to merchandising operations, it may be desirable to isolate sets of files either for inventory control purposes, order processing or in the interssts of avoiding fraud. Some examples will illustrate the functions.

In a mail order operation, shipments often can be expedited by providing lists of similar items that are to be shipped. Accordingly, it is desirable to isolate a subset of orders on the basis of the items ordered, for example as specified in block **140** of the storage cell of FIG. **5**. The same information is useful for inventory control. For example, after isolating a subset of orders or a specific article, the number of articles may be tallied to indicate inventory depletion.

As indicated above, isolating subsets of order data also may be helpful in avoiding fraud. Consider a likely gang operation. With an intention to defraud, a number of illicit credit cards may be acquired. Specifically, for example, the cards may have recently been stolen with tee consequence that they likely can be used for a short period of time. A potentially profitable use of the cards would be to support the purchase of a large volume of merchandise from a mail order establishment. Normally such an operation would involve readily marketable merchandise.

In the fraudulent use of the illicit cards, data falls into three categories. First, the card itself specifies certain data. Second, certain data involves the order; and third, data is provided to indicate the shipping destination for the merchandise. In a gang operation, a common shipping destination may be employed for a short period. Consequently, a major subset of merchandise order data designating a similar destination for merchandise should prompt suspicion. If the subset further indicates relatively marketable merchandise, further suspicion is aroused. Of course, at some point an investigation is desirable prior to delivering the merchandise. Accord-

ingly, it is important to assemble a data subset wherein the block **138** (FIG. **5**) specifies similar data.

Similarly, a sizable subset indicating multiple orders on the same credit card (block **132**) may also suggest the need for investigation. Reference will now be made to FIG. **6** indicating a symbolic arrangement for acquiring or defining subsets of data during the course of the processing operation.

As illustrated in FIG. **6**, the memory **32** is illustrated in FIG. **6** with the multiplicity of cells. The cells may be sensed by a scanner **150** illustrated for purposes of explanation as a mechanical apparatus. Of course, the system of the analysis means **88** (FIG. **1**) would incorporate solid state operation to accomplish the function of the scanner **150**. In any event, the scanner **150** sequentially receives the contents of cells C1 through CN for providing representative signals to a comparator **152** and an "and" gate **154**. The comparator **152** also receives signals from a reference register **156** which is in turn connected to receive signals from within the computer **22**, e.g. from the buffer **26**. The comparator **152** also receives a command signal in the form of a specified data block to indicate the portion of cell data units to be compared.

The output of the comparator **152**, a binary signal in a high state in the event of a comparison, qualifies the gate **154** to pass the contents of a cell to a set register **158**. Consider an exemplary operation.

Assume, for example, that it is desired to test the data in each of the cells C1 through CN with respect to specific health data. The reference health data would be set in the reference register **156** from any of the sources within the computer **22**. The comparator **152** would receive a test instruction for the digits in the data block **52** (FIG. **2**) reflecting the health data. The system would then be commanded to proced, and data from individual cells C1 through CN would be supplied through the scanner **150** to the comparator **152**. Upon the occurrence of a coincidence, the comparator **152** would qualify the "and" gate **154** to pass the data cell contents to the set register **158**. At the termination of the operation, the subset of data from the cells C1 through CN having the specified similarity would be contained in the set register **158**. Accordingly, such data could be further processed as suggested above within the analysis means **128**.

To consider another exemplary operation, assume the system of the present invention is embodied for a mail order facility and concern exists with respect to a volume of orders supported by illicit credit cards and destined for a "drop" address. In such an instance, the contents of the data block **138** (name and address data) as illustrated in FIG. **5** would be of concern. Accordingly, the comparator **152** would be set to test the contents of data block **138**. Next, the contents of cells C1 through CN would be sequentially applied to the reference register **158** and the comparator **152**. Upon detecting a coincidence between a pair of cells with respect to the data block **138**, one of the cells would be held in the reference register **156** to scan through the remainder of the cells C1 through CN and thereby accumulate a subset of data in the register **158** indicating a similar destination address for merchandise. With review, determinations could then be made either within the analysis means **28** or by a manual observation as to whether or not investigation appeared appropriate.

A wide variety of other possibilities, applications and formats in accordance herewith will be apparent to those skilled in the art wherein data is assembled, stored, identified, processed by testing as to isolate a subset or manifest data with sources reliably confirmed. With respect to identification data, it may be an identification such as a credit or ideniification card number, driver's license number, telephone number, etc. Alternatively, identification data may be a combination of identification-related data such as, for example, credit card number, merchant identification, expiration date of credit card and amount of transaction. For example, merchandising, polling, selecting and related operations are practical.

In view of the above explanation of the exemplary system, it will be appreciated that embodiments of the present invention may be employed in many applications to accumulate statistical data, process such data, and define subsets of callers of concern. While certain exemplary operations have been stated herein, and certain detailed structures have been disclosed, the appropriate scope hereof is deemed to be in accordance with the claims as set forth below.

What is claimed is:

1. A statistical analysis process for data from remote sources and for use with a communication facility including remote terminal apparatus for individual callers, wherein said remote terminal apparatus may comprise a conventional telephone instrument including voice communication means and digital input means in the form of an array of alphabetic numeric buttons for providing data, said process including the steps of:

interfacing said communication facility to provide voice signals and recive digital identification and answer signals representative respectively of identification data and answer data developed by said terminal apparatus under control of a caller;

generating voice signals and supplying said voice signals to actuate said terminal apparatus, as to provide vocal operating instructions to a caller;

providing sequence signals representative of sequence data indicating the time sequence of a call with reference to each of the calls from other callers;

initiating files and storing, (1) answer data for specific callers as indicated by said digital answer signals, (2) sequence data as indicated by said sequence signals and (3) identification data as indicated by identification signals identifying callers;

providing external data signals representative of external data distinct from answer data provided from said callers; and

comparing said answer data from said callers and analyzing said answer data with said external data in combination to isolate a select subset of said callers.

2. A process according to claim **1** including the further step of generating acknowledgement data for a call and storing said acknowledgement data as further identification data.

3. A process according to claim **2** including the further step of encrypting at lest part of said achknowledgement data prior to storing.

4. A process according to claim **2** including the further step of communicating at lest part of said acknowledgement data to a caller.

5. A process according to claim **1** including the further step of receiving a caller's telephone number as identification data.

6. A process according to claim 1 including the further step of generating further identification data to provide a plurality of distinct data elements for identifying a caller.

7. A process according to claim 1 including the further step of testing identification data of a caller as a condition to storing answer data.

8. A process according to claim 7 including the further step of maintaining a record of callers to restrict the extent of answer data stored for a caller.

9. A process according to claim 8 including the further step of limiting the answer data stored from a caller to a one-time entry from a single call.

10. A process according to claim 7 including the further step of limiting the use of the process to store data from individual callers during a specific interval of time.

11. A process according to claim 1 including the further step of storing a billilng indentification number as at least part of said identification data for a caller.

12. A process according to claim 1 including the further step of aborting the interfacing step on command of a caller by a specific answer signla to provide person-to-person communication.

* * * * *

EXHIBIT 2

United States Patent [19]

Katz

[11] **Patent Number: 4,930,150**

[45] **Date of Patent: * May 29, 1990**

[54] **TELEPHONIC INTERFACE CONTROL SYSTEM**

[75] Inventor: **Ronald A. Katz**, Los Angeles, Calif.

[73] Assignee: **First Data Resources Inc.**, Omaha, Nebr.

[*] Notice: The portion of the term of this patent subsequent to Dec. 20, 2005 has been disclaimed.

[21] Appl. No.: **260,104**

[22] Filed: **Oct. 20, 1988**

Related U.S. Application Data

[63] Continuation-in-part of Ser. No. 18,244, Feb. 24, 1987, Pat. No. 4,792,968, which is a continuation-in-part of Ser. No. 753,299, Jul. 10, 1985, abandoned.

[51] **Int. Cl.**[5] **H04M 11/06**

[52] **U.S. Cl.** **379/93;** 379/92; 379/67

[58] **Field of Search** 379/92, 93, 91, 67

[56] **References Cited**

U.S. PATENT DOCUMENTS

4,757,267	7/1988	Riskin	379/113
4,792,968	12/1988	Katz	379/92
4,797,911	1/1989	Szlam et al.	379/67

FOREIGN PATENT DOCUMENTS

8700375 1/1987 European Pat. Off. 379/91

OTHER PUBLICATIONS

Ozawa et al., "Voice Response and Its Applications", *Hitachi Review*, vol. 28, No. 6, 12/79, pp. 301–305.

"T/VIS Voice Response Telephone Interface", *Telesensory Speech Systems*, 1913.

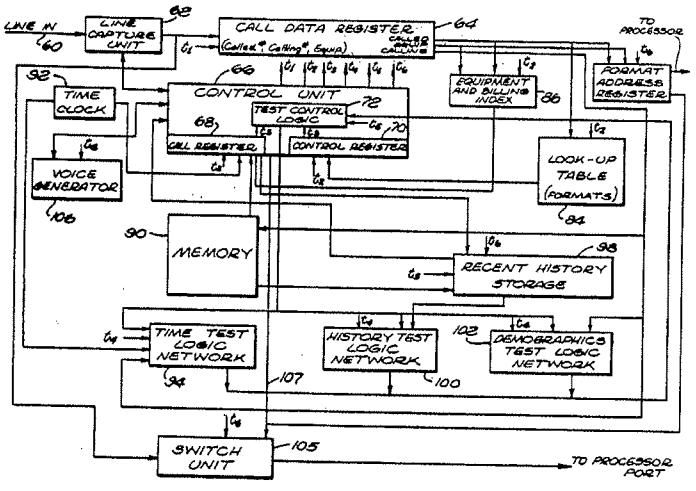
Primary Examiner—Robert Lev

Attorney, Agent, or Firm—Nilsson, Robbins, Dalgarn, Berliner, Carson & Wurst

[57] **ABSTRACT**

Call data signals actuated by a telephone terminal are provided from a telephone communication system to indicate call data as the called number, the calling number and the calling equipment. The call data signals address related control functions for interfacing a multiple-format multiple-port data processing system. Screening tests and format selection for the processing system are performed. Individual telephone terminals and individual data formats are interfaced under controlled conditions specified by the call data. Time tests, history tests and demographic tests are executed in addition to basic qualification tests. Control is executed from active data storage for assembled control words and record words. Record words for individual calls are stored along with developed billing data.

19 Claims, 5 Drawing Sheets



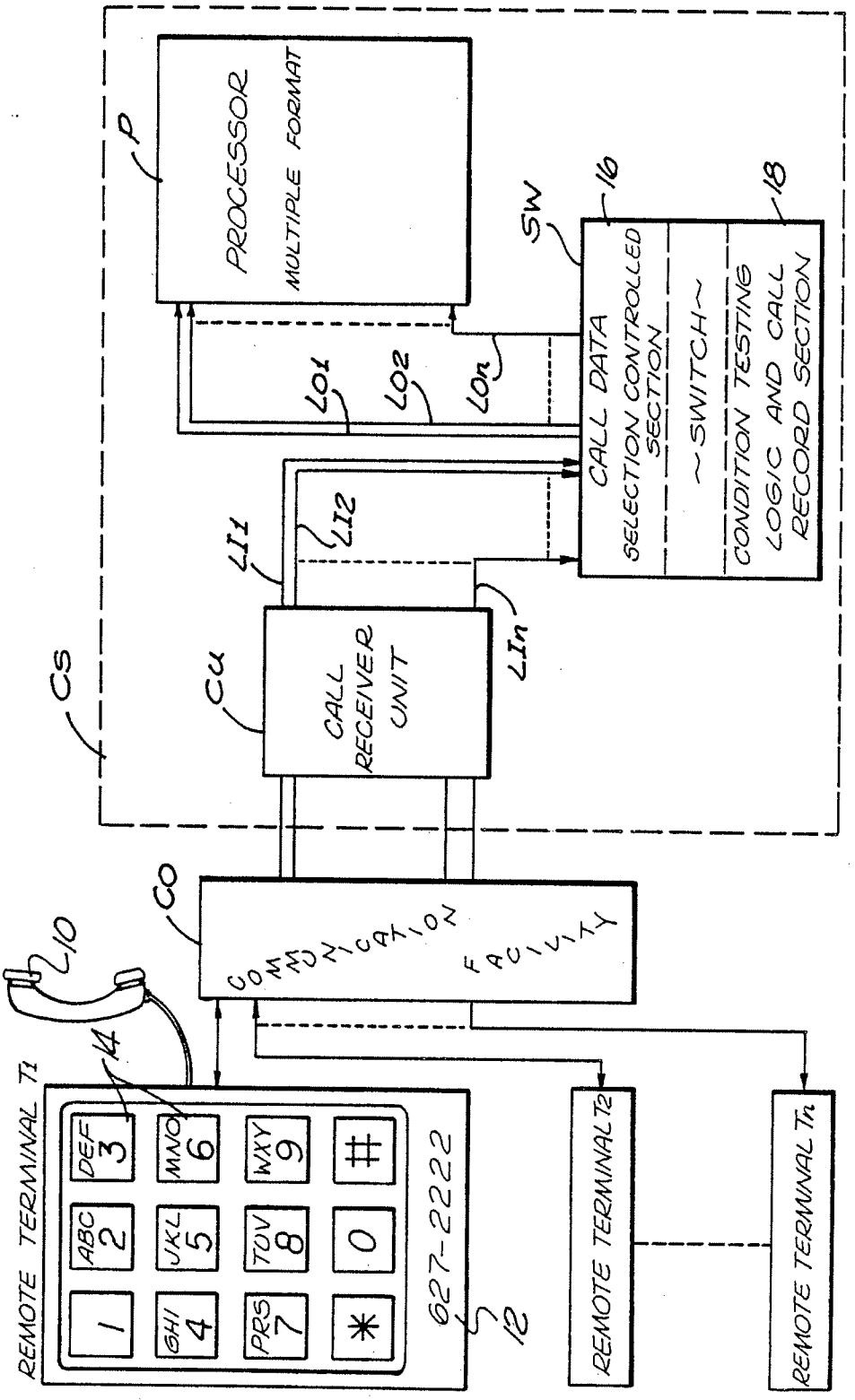
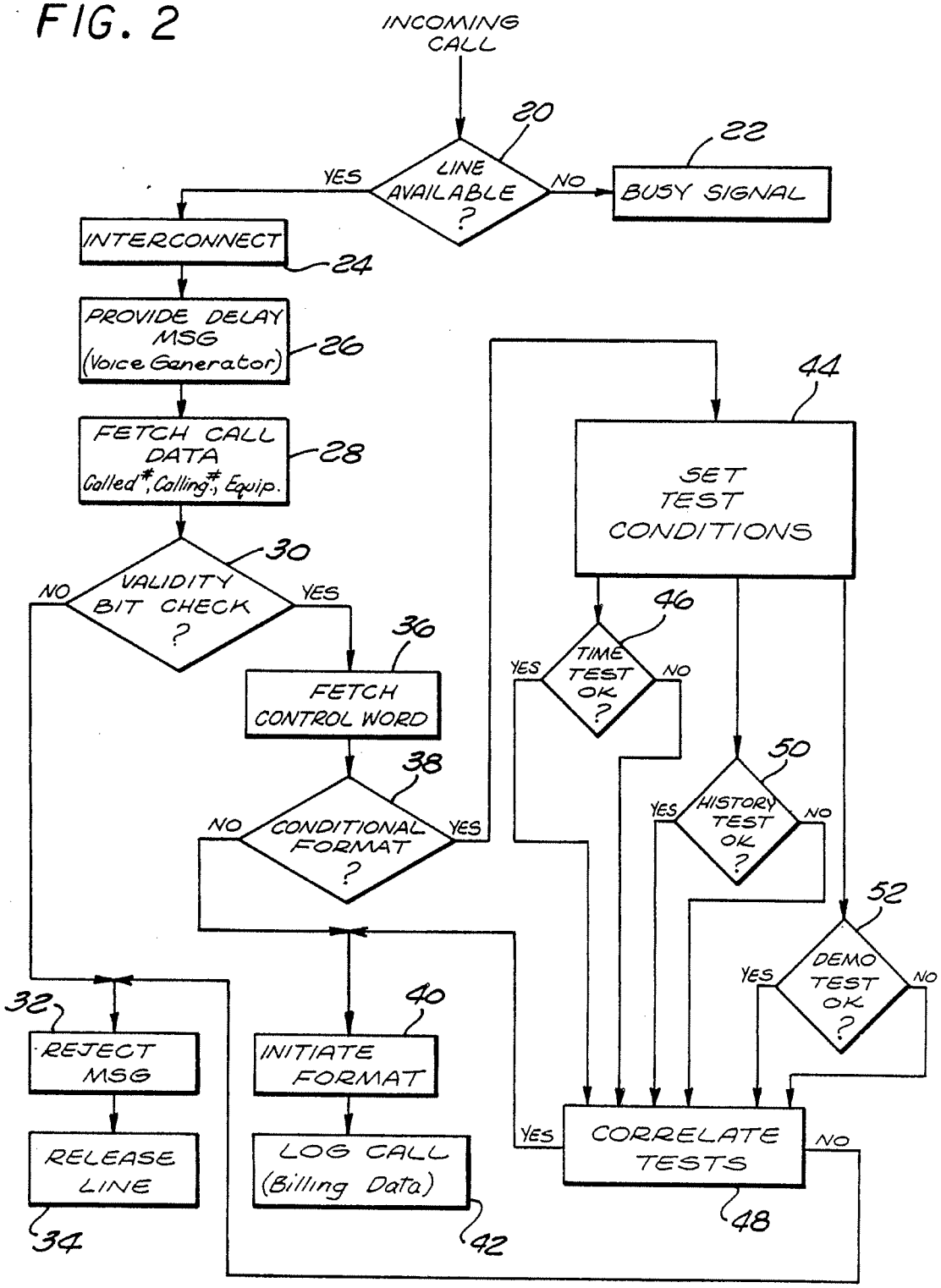

P
PROCESSOR
MULTIPLE FORMAT
SW
16
18
CALL DATA
SELECTION CONTROLLED
SECTION
~SWITCH~
CONDITION TESTING
LOGIC AND CALL
RECORD SECTION
L01
L02
L0n
L11
L12
L1n
Cs
Cu
CALL
RECEIVER
UNIT
Co
COMMUNICATION
FACILITY
10
14
REMOTE TERMINAL T1
1
2 ABC
3 DEF
4 GHI
5 JKL
6 MNO
7 PRS
8 TUV
9 WXY
0
*
#
627-2222
12
REMOTE TERMINAL T2
REMOTE TERMINAL Tn

FIG. 1

FIG. 2


INCOMING CALL
20
LINE AVAILABLE ?
YES
NO
22
BUSY SIGNAL
INTERCONNECT
24
PROVIDE DELAY MSG (Voice Generator)
26
FETCH CALL DATA Called#, Calling#, Equip.
28
30
VALIDITY BIT CHECK ?
NO
YES
36
FETCH CONTROL WORD
38
CONDITIONAL FORMAT ?
NO
YES
44
SET TEST CONDITIONS
46
TIME TEST OK ?
YES
NO
50
HISTORY TEST OK ?
YES
NO
52
DEMO TEST OK ?
YES
NO
32
REJECT MSG
RELEASE LINE
34
40
INITIATE FORMAT
LOG CALL (Billing Data)
42
YES
CORRELATE TESTS
NO
48

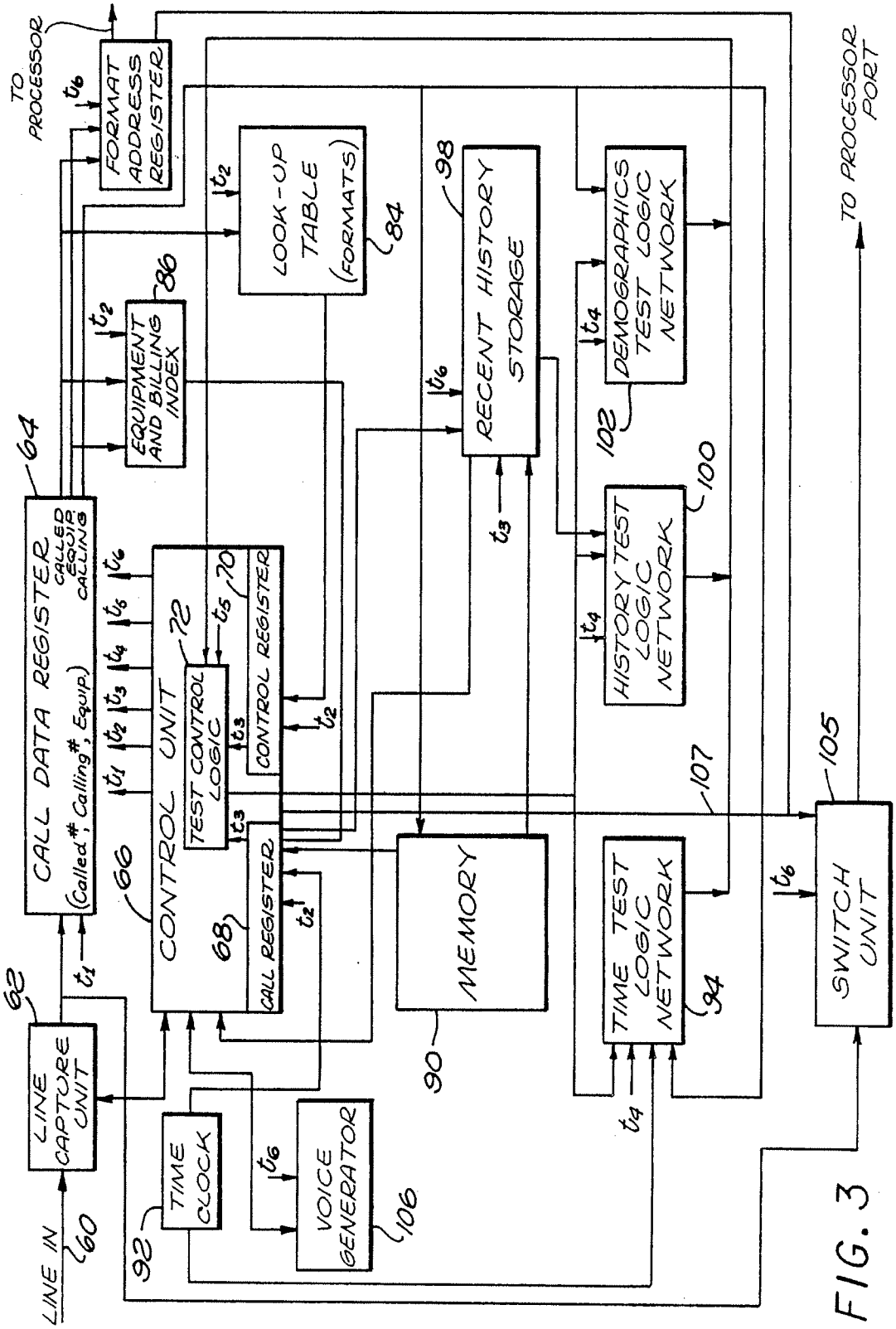

TO PROCESSOR
FORMAT ADDRESS REGISTER
LOOK-UP TABLE (FORMATS)
84
98
RECENT HISTORY STORAGE
DEMOGRAPHICS TEST LOGIC NETWORK
102
EQUIPMENT AND BILLING INDEX
86
64
CALL DATA REGISTER
(Called #; Calling #; Equip)
CALLED EQUIP
CALLING
HISTORY TEST LOGIC NETWORK
100
CONTROL UNIT
72
TEST CONTROL LOGIC
70
CONTROL REGISTER
66
68
CALL REGISTER
MEMORY
90
TIME TEST LOGIC NETWORK
94
107
105
SWITCH UNIT
TO PROCESSOR PORT
LINE CAPTURE UNIT
62
LINE IN
60
TIME CLOCK
92
VOICE GENERATOR
106
t1
t2
t3
t4
t5
t6

FIG. 3

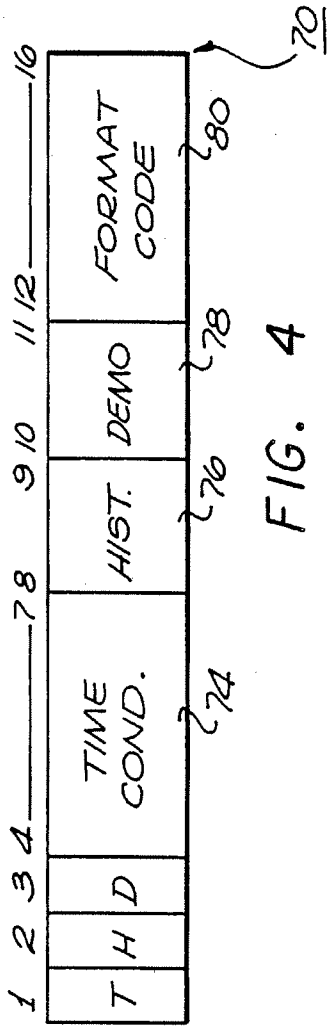

1
2
3
4
7 8
9 10
11 12
16
T
H
D
TIME COND.
HIST.
DEMO
FORMAT CODE
74
76
78
80
70

FIG. 4

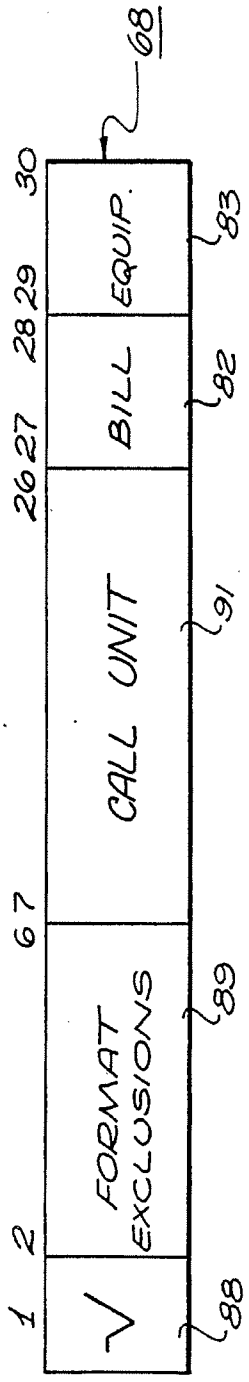

1
2
6 7
26 27
28 29
30
√
FORMAT EXCLUSIONS
CALL UNIT
BILL
EQUIP.
88
89
91
82
83
68

FIG. 5

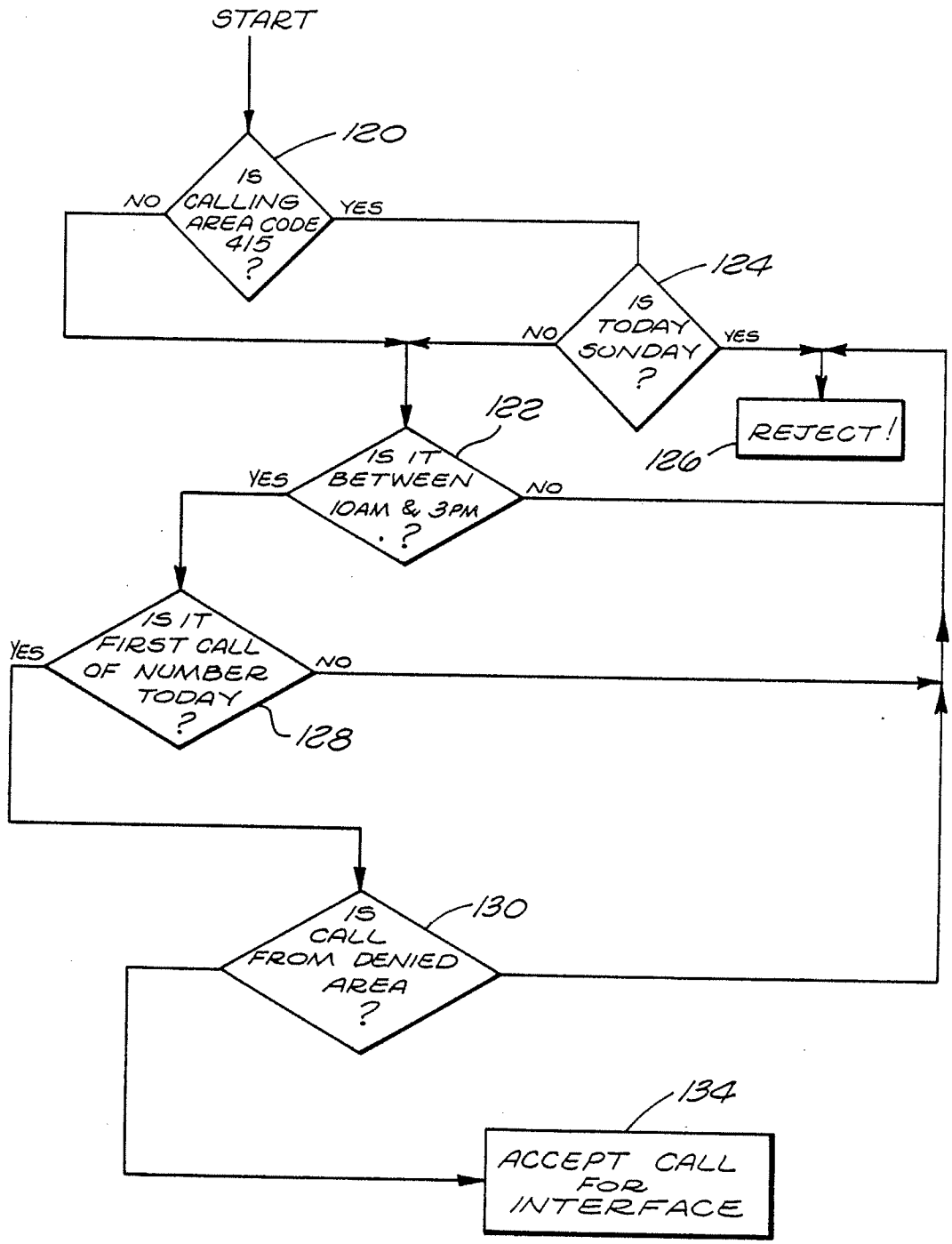

START
120
IS CALLING AREA CODE 415 ?
NO
YES
124
IS TODAY SUNDAY ?
NO
YES
REJECT!
126
122
IS IT BETWEEN 10AM & 3PM ?
YES
NO
IS IT FIRST CALL OF NUMBER TODAY ?
YES
NO
128
130
IS CALL FROM DENIED AREA ?
134
ACCEPT CALL FOR INTERFACE

FIG. 6

TELEPHONIC INTERFACE CONTROL SYSTEM

RELATED SUBJECT MATTER

This is a continuation-in-part of Application Ser. No. 018,224 filed Feb. 24, 1987 and entitled "Statistical Analysis System For Use With Public Communication Facility", now U.S. Pat. No. 4,792,968, which was a continuation-in-part of Application Ser. No. 753,299 filed July 10, 1985 and entitled "Statistical Analysis System For Use With Public Communication Facility", now abandoned.

BACKGROUND AND SUMMARY OF THE INVENTION

Over the past several years, substantial expansion has occurred in the technology of combining telephonic and computer systems. For example, telephone systems have been developed to readily transmit digital data. Various forms of modems are in wide-spread use to intercouple telephones and computers. However, at a more personal level, it also has been proposed to utilize the traditional dialing buttons of telephone instruments to provide digital data, as for processing. In accordance with such arrangements, voice messages prompt callers to provide data by actuating the alphanumeric buttons of conventional telephones. These systems have been proposed in association with computers to provide various services and one such system is disclosed in U.S. Pat. No. 1,792,968, issued 12/20/88 to Ronald A. Katz from an application Ser. No. 07/018,244 filed Feb. 24, 1987.

With respect to telephonic-computer systems, attaining the interface format desired by an individual caller is sometimes complex and burdensome. Specifically, callers may be misdirected, screening may be ineffective and delays may be cumbersome. Also, records may be poor or non-existent. As a consequence, a need exists for an improved interface system for selectively interfacing a considerable number of individual callers with a multiple format processor, as to attain efficient and economical digital and vocal exchanges along with data accumulation.

In general, the present invention comprises a telephonic-computer interface system accommodating digital and vocal (analog) telephonic communication and capable of handling a large number of calls to interface a plurality of formats in a computer apparatus. Accordingly, the system of the present invention interfaces: (1) a telephonic communication facility including remote terminals for individual callers, e.g. conventional telephone instruments including voice communication means, and digital input means in the form of alphanumeric buttons for providing data and (2) a multiple-port, multiple-format data processor for concurrently processing data from a substantial number of callers with respect to any of several formats.

The interface system incorporates a controller for receiving calls from remote terminals for association with ports in the telephonic computer apparatus, and which receives signal-represented call data (representing "calling" and "called" telephone numbers) along with equipment information. An index apparatus is controlled by the signal-represented call data to select a specific format of the processor so as to specify any conditions for the interface, at least one of the formats including at least one condition. A test apparatus determines whether or not an individual call attains specified

conditions and thereby controls switching structure for providing the actual interface. Data is recorded and processing procedures also may be controlled by call data.

BRIEF DESCRIPTION OF THE DRAWINGS

In the drawings, which constitute a part of this specification, an exemplary embodiment exhibiting various objectives and features hereof is set forth, specifically:

FIG. 1 is a block diagram of a system constructed in accordance with the present invention;

FIG. 2 is a flow diagram illustrating the operating process of the system of FIG. 1;

FIG. 3 is a block diagram of a component portion of the system of FIG. 1;

FIG. 4 is a diagrammatic representation of a binary control word as registered and utilized in the system of FIG. 1;

FIG. 5 is a diagrammatic representation of a binary data record word as utilized and recorded in the system of FIG. 1; and

FIG. 6 is a flow diagram illustrating the operating process of the structure represented in FIG. 5.

DESCRIPTION OF THE ILLUSTRATIVE EMBODIMENT

As required, a detailed illustrative embodiment of the present invention is disclosed herein. However, physical communication systems, data formats, and operating structures in accordance with the present invention may be embodied in a wide variety of forms, some of which may be quite different from those of the disclosed embodiment. Consequently, the specific structural and functional details disclosed herein are merely representative; yet in that regard, they are deemed to afford the best embodiment for purposes of disclosure and to provide a basis for the claims herein which define the scope of the present invention.

Referring initially to FIG. 1, a series of remote terminals T1–Tn (telephone instruments) are represented (left). The terminals T1–Tn are generally similar and accordingly only the terminal T1 is shown in any detail. The indicated terminals T1–Tn represent the multitude of telephone terminals existing in association with a communication facility CO which may comprise a comprehensive public telephone network.

The communication facility CO, along with the individual terminals T1–Tn, is coupled to a central processing station CS generally indicated by a dashed-line block. Generally with regard to the station CS, individual terminals T1–Tn are interfaced with a processor P (upper right) through a call receiver unit CU and a switch SW. In accordance herewith, individual telephone calls are preliminarily processed on the basis of signal-represented call data to identify a specific operating format of the processor P. The preliminary processing may impose screening tests to impose conditions or establish a test criteria for the switch SW to determine the acceptability of the call to interface with a specific operating format.

Calls are selectively processed according to a specific operating format as indicated by call data. At any instant of time, the collective interface may involve several thousand calls simultaneously being processed through ports of the processor P. Exemplary selected formats of the processor might include: public polls, lotteries, auctions, promotions, sales operations and

games. Accordingly, the processor P may take the form of a sizable computer capable of simultaneously processing many calls involving several different formats. Although numerous possible configurations are available, for purposes of explanation, the processor P is illustrated simply as a block with multiple ports. Note that while the switch SW and the processor P may be integrated in a single system, they are separately illustrated to isolate the detailed structure and process of the present invention.

Input lines LI1 through LIn from the call receiver unit CU enter the switch SW to provide calling data and communication paths. Output lines LOI through LOn function similarly between the switch SW and the processor P. Note that various multiplexing techniques are well known in the telephonic art to communicate call data and may be employed in the system.

Considering the system somewhat summarily, individual calls originating at the terminals T1–Tn are coupled through the communication facility CO and the call receiver unit CU to the switch SW. Call data, representative of calls, actuates the switch SW to preliminarily process each call based on the desired format. Accordingly, depending on the desired format (indicated by the called number and the equipment data) calls are screened by testing for specific conditions. Furthermore, record data is assembled for storage.

Considering the system of FIG. **1** in somewhat greater detail, the exemplary telephone terminal T1 includes a handpiece **10** (microphone and earphone) and a panel **12** provided with a rectangular array of push buttons **14** in a conventional configuration. Of course, the handpiece **10** accommodates analog signals while the panel **12** is a digital apparatus. Generally, the handpiece **10** serves to manifest analog or voice signals to a caller.

In accordance with conventional telephone structure, alphabetic and numeric designations are provided on the buttons **14**. For example, several of the buttons **14** carry three letters along with a decimal digit. Specifically, the button designated with the numeral "2" also carries the letters "A", "B" and "C". Thus, the buttons **14** encompass the numerals "0–9" two symbols, and the alphabet except for the letters "Q" and "Z". Consequently, the buttons **14** substantially accommodate the entry of decimal and alphabetic data.

At this stage, same specific aspects of the communication facility CO are noteworthy. Essentially, with telephonic dialing, the communication facility CO couples selective terminals (from the multitude of terminals T1–Tn) to the call receiver unit CU. In that regard, the call control unit CU at the central station CS may be reached by any or a plurality of called numbers. For example, the call unit CU might be reached by any of twenty telephone dialing numbers, each associated with a specific operating format of the processor P. One called number or set of numbers might be associated with an auction format of the processor P. Another number or set of numbers might be associated with sales operating formats. Still another called number or set of numbers might identify a game format, and so on.

Incoming calls to the call receiver unit CU are identified by call data in accordance with telephone system techniques. As described below, the call data may specifically include digital signals representative of the called number the calling number (terminal number) and the terminal equipment.

In addition to attaining a preliminary interface with a selected format, individual calls may be screened based on the called number (identifying an operating format) and the calling number (caller identification) or the equipment. That is, the system of the present invention is based on a realization that signal-represented call data can be effectively utilized to selectively interface individual callers at remote terminals with specific operating formats of a data processor.

Considering the call data in somewhat greater detail, in accordance with current telephone systems, the communication facility CO may provide signal-represented call data for: the "called" number, the "calling" number and the equipment, e.g. "pulse" or "tone" terminal. Specifically, operating telephone equipment termed "DNIS" automatically provides the called telephone number in digital form from the communication facility CO. Somewhat similarly, existing telephonic equipment designated "ANI" automatically indicates the caller's (calling) number in digital signal represented form. Generally, time shared lines carry such call data and also may provide call data indicating equipment. Thus, the call unit CU may receive the called number, the calling number and an equipment designation, collectively termed call data, which data is utilized to establish control functions, as for example to select an operating format of the processor P and screen individual calls.

As described in detail below, call data is registered in the switch Sw to perform distinct control operations. Specifically, a selection section **16** of the switch SW identifies a specific desired format of the processor P. A testing section **18** of the switch SW screens calls for interface connections between individual terminals T1–Tn and the processor P.

In the illustrative system of FIG. **1**, an operating process is executed as illustrated in FIG. **2**. Each incoming call prompts a preliminary query as indicated by block **20** concerning the availability of a line or port into the processor P. In the absence of an available line, a busy signal is provided as indicated by the block **22**. Alternatively, an available line results in a preliminary interconnect as indicated by a block **24** setting a conditional connection into operation.

As indicated by a block **26**, during the screening or testing interval (typically measured in seconds or fractions of seconds) the caller remains on line and may receive a message. That is, the caller might hear silence or may continue to hear the traditional telephonic ringing sound. Alternatively, the caller might be given a brief vocal message to "stand by" as indicated by the block **26**. In any event, the caller is held "on line" while the process continues.

With a call on a line, the communication facility CO (FIG. **1**) provides signal-represented call data, e.g. the called number, the calling number and the equipment designation. As indicated by block **28** (FIG. **2**) signals representative of the call data are captured to perform preliminary processing operations as will now be considered.

In the disclosed embodiment, as an initial test operation, the calling number is checked for validity as indicated by a block **30**. For example, a list of calling numbers may be compiled that are to be denied access to any interface with the processor P. Negative calling numbers may result either by the choice of the person responsible for the calling number terminal, or by the choice of the service operating the processor P (FIG.

1). For example, an accumulation of prior improper transactions from a terminal designated by a specific telephone number may provide a basis for complete disqualification. Equipment also may disqualify.

Recognizing that various circumstances may be involved with respect to the total disqualification of a calling terminal, in accordance herewith the test involves formulation of a validity bit as indicated by the query block **30**. Acceptable calls set the validity bit at a binary "1".

If the calling terminal is invalid, ("no" from the block **30**) the call is rejected as indicated by the block **32** with or without a message and the line is released as indicated by the block **34**. Note that the time interval involved is very short and the rejection message may take various forms including a verbal comment, a busy signal or simply a disconnected signal.

If a positive validity bit ("1") is formed at the junction of the query block **30**, a control word is fetched under command of the called number as indicated by the block **36**. As described in detail below, a control word is available or each operating format of the processor P and is utilized to impose the conditions for an interface and the terms of any associated billing.

As indicated in FIG. **2**, the fetched control word of the block **36** prompts an inquiry as to the conditions attendant the selected operating format as indicated by a query block **38**. That is, in the process, the query of block **38** determines whether further conditions are imposed for attaining interface with the processor P. If no further conditions are imposed, the format is initiated by pursuing the connected interface as indicated by a block **40**. Also, as indicated by a block **42** the call is logged or recorded as with respect to billing data for example.

If access to a format involves conditions ("yes" from the query block **38**), tests are specified as illustrated by a block **42**. That is, conditions for the interface are specified by the block **44**. Of course, the specific tests may involve various criteria; however, in the illustrative embodiment, the conditions involve time, history and demographics. Each exemplary condition will now be considered somewhat preliminarily.

In the disclosed embodiment, time tests involve testing the time or the call against certain limitations. For example, it may be desirable to limit some formats to specific time intervals as in relation to a television broadcast, a real time auction and so on. Note that the time tests also may be related to specific terminal control and geographic areas treated on the basis of telephone area codes. Specific examples will illustrate.

Assume an operating game format that propounds questions to a caller based on knowledge of a particular television program. The program may be broadcast at different times in different geographic areas, and as a consequence it may be desirable to limit calls interfacing the processor format depending on the area code of calling numbers. Accordingly, time tests may involve solely the instant time, or various combinations of time and call data. The specific test is determined as indicated by a block **46** (FIG. **2**) imposing detailed operating instructions for the format. The test results are then correlated as represented by a block **48**.

As indicated above, in accordance with the described embodiment, another test involves a historical record as for example directed to the station identified by the calling number. As an example, the record might take the form of either a negative or a positive file (for an individual format). In that regard, formats involving "pay to dial" calls might be conditioned as a group. Generally, in the case of a negative file, certain numbers are recorded that are to be denied access to a particular operating format. In the case of a positive file, access to the operating format is available only to calling numbers listed in the file.

Considering exemplary implementations of the system, a negative file may be based on limited or restricted use (as in the case of a lottery) or prohibitive use (telephone terminal owner choice). Formats accessible on a "one-time only" basis also may be controlled by negative lists. Thus, an operating format may be inaccessible to a terminal, or may be accessible a specified number of times during a specified interval, e.g. three accesses per week. The historical test is symbolized in FIG. **2** by the query block **50** to conditionally actuate the related tests as indicated in the block **48**. History limitations also may involve purely format limits. For example, a give-away or dial-free format may be limited to some predetermined number of calls for a period, e.g. ten thousand calls per day. Thus, limits can be imposed on the economic exposure of a format.

Moving from the historic considerations, demographic tests may be specified as in relation to the geographic area manifest by the area code of the calling number. To consider a specific example, a public opinion poll may be conducted in which a particular geographic balance is defined. In such an operating format, calls maY be accepted only until particular quotas are attained with respect to specified area codes. Such tests in the process are indicated by the query block **52**, again to instruct the correlation block **48**.

With the requisite tests established by selection of a format, the clock **48** indicates resolving the acceptability of the call for the selected interface face format. If the call is accepted, the process moves to initiate the selected format interface as indicated by the block **40**. Conversely, if the call is to be rejected, the process moves to the step indicated by block **32**, i.e. reject the call as with a message and release the line.

Exemplary detailed structure of the switch SW (FIG. **1**) for executing the process of FIG. **2** is represented in FIG. **3**. in that regard, individual telephone calls are manifest from the call receiver unit CU (FIG. **1**) comprising existing equipment as well known in the prior art. The call data is supplied through a line **60**, upper left, FIG. **3**. Note that the represented single line **60** is merely symbolic of a channel to carry call data and provide direct telephone communication.

Generally, the system of FIG. **3** illustrates elements of the switch SW of FIG. **1** for processing an individual call. As indicated above, the system of the present invention involves the simultaneous processing of many calls with the possibility that numerous calls are simultaneously being tested for an interface as explained above. Consequently, although the system of FIG. **3** is illustrated with respect to testing a single call, it is to be understood that sequential or parallel operations and multiplexing techniques, as well known and widely practiced in the computer field, are utilized to accomplish multiple processing operations as described below with reference to FIG. **3**.

The line **60** (FIG. **3**, upper left) enters a line capture unit **62** through which signal-represented call data is supplied to a call data register **64**. Accordingly, the call data is registered to be available for processing operations as explained generally with reference to FIG. **2**.

The line capture unit **62** also is connected to cue a control unit **66**. Structurally, the control unit **66** may take the form of various computer facilities incorporating memory and logic capability to sequence and control specific functions explained below. In that regard, the control unit **66** provides a series of timing signals **t1–t6** to sequence the operations of individual component blocks as illustrated. Note that to preserve clarity in FIG. **1**, connections of timing signals **t1–t6** are not illustrated.

The control unit **66** specifically includes a call register **68**, a control register **70** and test control logic **72**. The control register **70** receives format control words specified by the called number and having a form as illustrated in FIG. **4**.

Recapitulating, each of the operating formats has a control word for defining any access conditions or limitations to interface the format in the processor P (FIG. **1**). Basically, the control words are sixteen bits, illustrated as the first sixteen bits (**1–16**) registered in FIG. **4**. Additional registered bits (**17–20**) are provided from call data.

The initial three registered bits in the control register (FIG. **4**) serve as test command bits respectively for a time test, a history test and a demographics test. The presence of a "**1**" bit in any of the first three bit locations specifies the requirement for testing compliance to specified conditions. A "0" bit indicates no test.

The bits "**4** through **7**" in the control register constitute a field **74** and specify time conditions in relation to the instant time of the call. The field **74** may specify eight distinct time conditions. For example, exemplary specified conditions for a format might be as follows:

Accept calls between 7:00 and 18:00,
Accept calls on Thursday between 9:00 and 10:00,
Accept calls from area code 213 on Wednesday between 15:00 and 16:00,
Accept calls from area code 602 on Wednesday between 16:00 and 17:00.

Essentially, the time condition field **74** (activated by the time bit "1"—first bit position) defines specific intervals during which calls will be accepted for the specific called number and may be further limited by the area codes. A wide range of possibilities are available to accommodate specific programs for individual formats.

A field **76** in the control register embraces bits "8" and "9" and defines the conditions for access to the format based on historical considerations. Thus, two bits are provided to indicate four possible historical limitations. Again, the test is specified by a "1" bit, in this instance in the second bit location of the register **70**. The following limitations are exemplary of many possibilities:

Accept one call per day,
Accept one call per week,
Accept one call per month,
Accept one call during any three-day period,
Accept only 10,000 calls.

Continuing with respect to the contents of the register **70**, as illustrated in FIG. **4**, bits "10" and "11" constitute a field **78** specifying demographic test limitations. Again, a few examples will illustrate the various possibilities:

Accept calls only from area code 213,
Accept calls from area codes 213, 818 and 619,
Accept only 1,000 calls from area code 213,
Accept calls from area code 213 with the prefix numerals 619.

Again, the demographic text is imposed only upon the existence of a "**1**" bit, in this instance in the third bit of the control word. As in the other cases, specific possibilities are considerable.

The bits "12"through "16"of the control word constitute a field **80** and designate a code for the identified format. These five bits enable a substantial number of formats to be designated and coded with respect to various classifications. For example, lottery formats might be encoded in a "100" decimal series, e.g. "101, 102, 103 —110, 111, 112"—and so on; auctions might be designated in a "200" series, e.g.: "201, 202, —". By using decimal equivalent coding formats for various categories, exclusions may be concisely stated. For example, a calling number may be excluded from all lottery operating formats simply by the specification of decimal "100".

The data, as illustrated in FIG. **4** is loaded into the control register **70**. Again, the first sixteen bits comprise the format control word and are provided from a look-up table **84** (FIG. **3**, right, central). The last bits (bits **17–20**) are provided from an equipment and billing instruction index **86**. That is, in response to the signal-represented call data indicating the called number and the equipment, the look-up table **84** and the index **86** supply data for loading the control register as indicated above.

While the control register **70** is loaded to specify the operation of the system, the call register **68** in the control unit **66** receives signals for additional control and to formulate a record of the call. Specifically, as represented in FIG. **5**, the contents of the call register **68** includes the initial validity bit **88** for indicating that the called number is either on a positive list or is not on a negative list. The determination of the validity bit for location **88** is made by reference to a memory **90** (FIG. **3**, central) addressed by the calling number.

While the calling number addresses data to indicate a validity bit, specific format exclusions also may be indicated as explained above with respect to certain formats. For example, certain classifications of formats or specific formats (as a lottery) may be identified as inaccessible for certain telephone terminals as identified by calling numbers. Other than lottery formats, certain discretionary formats also may initiate control to limit access. Accordingly, a field **89** in the register **68** of FIG. **5** (bits "2" through "6") is provided from the memory **90**, addressed by the calling number to specify format exclusions. That is, the calling number addresses the memory **90** to load the field **89** and specify limitations. Consider a few examples of format exclusions or limitations:

No lottery formats,
One lottery format per week,
Two lottery formats per month of total cost under $25.00,
No auction sales,
Auction sales only with code I.D. 763.

Again, it will be apparent that many possibilities exist in applying various coding techniques, the above merely being exemplary.

The bits "7"through "26" of the call register **68** (FIG. **5**) constitute a field **91** and indicate the time of a call. Signals representative of the instant time of a call to load the field **90** are provided from a time clock **92** (FIG. **3**, upper left). Signals from the time clock **92** may be in a Julian code and are provided to the call register **68** and also to a time test logic network **94** (lower left).

The last bits (27–30) in the register 68 are provided from the call data. The bits "27" and "28" indicate billing data and comprise a field 82. Again, representations are coded; however, with respect to the field 82 information is derived from the called number. For example, an "800" called number may indicate no billing with the representative code being stored in the field 82. As another possibility, a "976" prefix number, or "900" number, may indicate a specific charge in relation to the identified format.

The bits "29" and "30" comprise a field 83 and may actuate a special form of the selected format. In the disclosed embodiment, the field 83 registers call data, as to indicate that the calling terminal is a "pulse" (rotary dial) signal unit or a "time" (touch) signal unit. In the instance of a rotary terminal, the format program may be modified to accommodate "pulse" signal operation or inject operator communication.

Recapitulating to some extent with regard to the composition of the call record word in the register 68 (FIG. 5), the memory 0 (FIG. 3) is addressed by calling number data to provide data for the validity bit location 88 and the format-exclusion field 89. The time of call is stored in the field 91 from the clock 92. The billing and equipment data are provided by the index 86 in response to "calling" data signals.

Another element of memory, specifically, a recent history storage 98 (FIG. 3, lower right) is separately illustrated for convenience of explanation. Essentially, the storage 9 receives words from the call register 63 to maintain a record of interface calls. The recent history storage may periodically be purged to permanent storage if desired. Thus, the recent history storage 98 accumulates a historical record of all interface participants with respect to specific formats and is utilized in the history test for determining that an instant calling terminal is within the specified historical limitations as provided from the memory 90.

The history tests are performed by a history test logic network 100 (FIG. 3, lower central). In a related context, the demographics test as explained in detail above is performed by a demographics test logic network 102. The results of the test logic networks are communicated to the test logic 72 in the control unit 66. As a consequence a switch unit 105 is actuated to either operatively couple the line 60 into a port of the processor P (FIG. 1) or reject the call. If a call is accepted for an interface, a signal is supplied from the test control logic 72 through a line 107 to the switch 105 during the interval of the timing signal T6. The signal in the line 107 also is supplied to a format address register 109 for addressing the processor P The register 109 stores select data signals to address a specific operating format of the processor P.

Recapitulating to some extent, call data indicates an interface format of the processor P (FIG. 1) with associated limitations, conditions and billing provisions. Call data also indicates possible format limitations or conditions for a calling number. The system processes the data with respect to the conditions and limitations to selectively enable interface operations.

In view of the above structural description of the system of FIG. 3, the process as described with respect to FIG. 2 and the stored control word forms as described with respect to FIGS. 4 and 5, a comprehensive understanding of the described embodiment may now best be accomplished by assuming an exemplary call and treating the individual responsive steps. Accordingly, assume the occurrence of a call as manifest on the line 60 (FIG. 3, upper left). Further, assume that the called number, "976 513 7777" designates a lottery format with limited access. Details of the limited access will be treated below.

Upon occurrence of the call, the line capture unit 62 seizes a line relationship and signals the control unit 66. Immediately, an interval of time signal t1 is initiated and the register 64 is loaded with the called number ("976 513 7777"), the calling number ("415 318 4444") and the equipment designation (tone). To the caller, the operations as now described involve an almost imperceptible delay.

During the following interval of timing signal t2, the call register 68 and the control register 70 are loaded as illustrated in FIGS. 4 and 5. Specifically, the called number and equipment designation specify data to load the control register 70. The calling number ("415 318 4444") from the register 64, prompts the memory 90 to load the validity bit 88 and the format exclusions in the field 89 of the register 68. Concurrently, the time clock 92 loads the field 90 with signals representative of the current time.

If the call register 68 does not receive a validity "1" bit, the calling number is indicated to be barred with a consequence that the line is released by the control unit 66. In tnat regard, a voice generator 106 (FIG. 3, left central) may be actuated by the control unit 66 branching to the operation of timing signal t6. Accordingly, a message of denial may be provided on the line 60 prior to release of the line. Note that the voice generator 106 may be variously used to prompt or inform callers in certain preliminary selection operations supplemental to the specific operations disclosed below.

As indicated above, concurrently with the loading of the call register 68 (timing signal t2), the control register 70 also is loaded. Specifically, from the register 64, the called number cues the look-up table 84 to fill most of the control register (bits "1"through "16", FIG. 4). The fields 82 and 83 are supplied from the index 86.

That is, distinct from the fields loaded into the control register 70 from the look-up table 84, the fields 82 and 83 are supplied from the index 86. In that regard, assume the called number (area code 976) indicates that the charge for the service of the call will be billed through the caller's telephone records. Assume that the field 83 indicates a "tone" terminal effective for a conventional digital interface.

At this point, some still further assumptions will be made to pursue the explanation of the detailed operations. Specifically, assume that the format specified by the called number ("976 513 7777") is a lottery format and includes limitations with respect to time, history and demographics. Accordingly, the initial three bits of the control word all will be "1" bits in the control register 70.

Assume further tnat the time conditions specified by the field 74 (FIG. 4) limit calls from area code 415 to days other than Sunday. Assume that the history field 76 of the control word imposes a limitation of one call per day. Assume that the demographics field 78 excludes any call from area codes "512", "412", "812", — (not "415"). Finally, assume the selected format (field 80) designates a specific lottery format, that is lottery "128".

In addition to registration of the data sets detailed above, because a history test is specified, the recent history storage 98 is cued during the interval of timing

signal t3. The operation is through the memory **90** by the control unit **66** to prompt the supply of historical data (previously registered record words) for the telephone terminal designated by the calling number ("415 318 4444"). Specifically, during the interval of timing signal t3, the storage **98** supplies data on the calling number to the history test logic network **100**. Such data is compiled into a test format as to indicate the number of calls per day, per week, and so on. Note that aggregate call totals may also be supplied as a test criteria. Thus, the control unit **66** coordinates the test criteria data preparatory to the test operations of the individual logic networks **94**, **100** and **102**.

To summarize, in accordance with the above assumptions, the test control logic **72** is set up to coordinate the following specific logic tests:

Time limitation test by network **94**: accept calls from area code 415 except on Sunday,

History limit test by network **100**: accept only one call per day,

Demographics rest by network **102**: accept no calls from area codes 512, 412, 812 — (415 not listed).

As explained above, in addition to the limitations specified, in relation to the format, further limitations may be specified by the calling number. Such limitations are specified by the field **89** in the register **68** (FIGS. **3** and **5**). In the instant example, assume that according to the record word, participation in the lottery format is limited to the interval between 10:00 a.m. and 3:00 p.m., e.g. when minors are in school. The code for such a format is supplied during the interval of timing signal t3 from the field **89** of the call register **68** to further establish the set-up of the logic **94** acting through the test control logic **72**.

Recapitulating with regard to the test control logic **72**, essentially a program is defined imposing each of the limitations that are specified by the call data in sufficient detail that comparison tests are expediently performed by the networks **94**, **100** and **102**. It is stressed, as indicated above, that the tests are selectively performed only in the event a "1" bit appears in the representative first three bit locations of the control word format. In the illustrative example, all the tests were commanded and accordingly the test control logic **72** sets up the condition for tests to be performed by the networks **94**, **100** and **102**, all during the interval of timing signal t3. Of course, the specific example represents one possibility of a substantial number of programs that might be specified to the system.

With the test formats established in the test control logic **72**, the logic networks **94**, **100** and **102** are driven during the interval of test signal t4 to execute a program in accordance with the assumed example. The process may be variously implemented in logic using well known techniques and is detailed in FIG. **6**. Consider the time test of the network **94**. The time test logic network **94** approves an interface only if: the call is not from area code "415" on a Sunday and furthermore the call occurs between the hours of 10:00 a.m. and 3:00 p.m. As indicated in FIG. **6**, a decision block **120** resolves the area-code "**415**" time test. If the area code is not "415", the logic proceeds to the next query block **122**. Alternatively, if the area code is "415", the day must be tested against Sunday as indicated by the query block **124**. An affirmative indication from the Sunday test of block **124** prompts a rejection as indicated by the block **126**.

If the Sunday test of block **124** is passed, the program imposes another time test, that is the time-of-day test as indicated by the block **122**. Again, a negative result prompts a rejection; however, a positive result involves the next step as indicated by the block **128**.

Note that the operations designated by query blocks **120**, **122** and **124** are performed by the time test logic network **94** (FIG. **3**). The next test of the block **128** is performed by the history test logic **100**.

The block **128** (FIG. **6**) involves a determination of whether or not the instant call is the first for the calling terminal on the instant calendar day. If not, the limitations are exceeded and the call is rejected. If the test is passed, the process next involves the demographic test logic network **102** (FIG. **3**) to determine whether or not the call originated from an excluded area based on the calling number area code.

Area controls are illustrated by the query block **130** of FIG. **6**. Specifically, the demographics test logic network **102** determines whether or not the current call is from a denied area. If so, the call is rejected as indicated by the block **126**. Alternatively, if the area is not excludes, as illustrated by the block **134** in FIG. **6**, the interface is accepted. In the instant case, the area "415" is acceptable.

In the operation of the system as illustrated in FIG. **3**, the logic networks **94**, **100** and **102** indicate test results to the test control logic **72** during the interval of the timing signal **t5**. The logic **72** correlates the test result for action by the control unit **66**. If the imposed conditions are met, the control unit **66** actuates the switch unit **105** and the address register **109** through the line **107** to perfect the interface from the line **60** (upper left) to a port in the processor P (FIG. **1**). Essentially, during the interval of the timing signal t6, the switch unit **105** couples the line **60** to a part in the processor P. Concurrently, the address register **109** specifies the select operating format to the processor P. Thus, a caller is set up for a select interface format.

Also during the interval of the timing signal t6, the contents of the call register **68** is stored in the recent history storage **98**. Note that billing data is stored with the call word is and may be selectively extracted from the storage **98**. At the termination of the timing signal t6, the interface endures until "disconnect".

The select format may involve various records, however, in accordance with the system of the present invention affords considerable flexibility to program individual conditions and limitations for each interface format based on the call data (calling number and called number). An interface may involve no conditions or conditions may be imposed from the called number (format selection), the calling number, or both. Accordingly, effective control may be imposed depending upon the service requested as manifest by an individual format, the instant time, the history of use and the demographics involved. The imposed limitations may be non-existent or may involve a relatively complex test pattern as explained in detail above.

In the disclosed embodiment, an effective record of calls is accumulated in the recent history storage **98**. Thus, a composite and detailed record is accumulated of individual calls as executed.

It is to be appreciated that numerous formats may be implemented and controlled utilizing the principles of the system as illustrated above. Accordingly, it is to be understood that the system of the present invention

should be interpreted in accordance with the claims as set forth below.

What is claimed is:

1. An interface control system for use with, (1) a communication facility including remote terminals for individual callers, wherein said remote terminals may comprise a conventional telephone instrument including voice communication means and digital input means for providing data, and (2) a multiple port, multiple format processor for concurrently processing data from a substantial number of callers in any of a plurality of format, said interface control system comprising:

call data means for receiving calls from said remote terminals in association with ports of said multiple port, multiple format processor, said calls providing signalrepresented call data to said call data means;

selection means for selecting one format of said plurality of formats of said multiple port, multiple format processor, said selection means being controlled by said signal-represented call data from a calling remote terminal to thereby specify defined conditions for a connection to said multiple port, multiple format processor, at least one of said formats having at least one specified condition;

test means for testing the specified defined conditions for a calling remote terminal to provide approval signals; and

interconnect switch means for providing connections from the ports of said multiple port, multiple format processor to a calling remote terminal under control of said approval signal from said test means.

2. A system according to claim 1 wherein one of said test means comprises means for executing a test based on the time of a call.

3. A system according to claim 1 wherein one of said test means comprises means for executing a test based on the history of the calling remote terminal.

4. A system according to claim 1 wherein one of said test means comprises means for executing a test based on the demographics of the calling remote terminal.

5. A system according to claim 1 wherein said index means includes a look-up table for specifying said formats of said processor addressed by said call data.

6. A system according to claim 1 including a control storage location and means for setting control data in said control storage location responsive to said call data to thereby control said test means.

7. A system according to claim 1 further including voice generator means for prompting a caller.

8. A system according to claim 1 further including means for storing data representative of calls.

9. A system according to claim 8 wherein said means for storing includes means for storing billing data.

10. A process for interfacing a telephonic communication system including remote terminals with a multiple port, multiple format data processing system, said multiple port, multiple format data processing system for concurrently processing data from said remote terminals according to a plurality of formats, at least one of said formats having at least one condition for a calling terminal, and wherein said telephonic communication system provides call data signals, as to indicate called and calling numbers, said process including the steps of:

receiving said call data signals from said telephonic communication system for a calling remote terminal;

selecting a processing format of said multiple port, multiple format processing system for the calling remote terminal under control of said data signals as the selected format;

testing the selected format in relation to said call data signals; and

conditionally interfacing said selected format to a calling terminal under control of said testing of call data signals.

11. A process according to claim 10 further including the step of fetching control data addressable with said call data for use in the step of testing.

12. A process according to claim 11 including the step of composing a control word defining conditions for interfacing

13. A process according to claim 11 wherein said step of fetching control data includes fetching data to specify time constraint conditions.

14. A process according to claim 1 wherein said step of fetching control data includes fetching data to specify use history conditions.

15. A process according to claim 11 wherein said step of fetching control data includes fetching data to specify demographic conditions.

16. A process according to claim 10 further includes the step of formulating a record data word of a call.

17. A process according to claim 16 wherein said record data word includes billing data.

18. A process according to claim 16 wherein said record data word includes format data.

19. A system according to claim 1 wherein one of said test means comprises means for executing a test based on historical limitations applied to an individual format.

* * * * *

EXHIBIT 3

US005128984A

United States Patent [19]

Katz

[11] Patent Number: 5,128,984

[45] Date of Patent: Jul. 7, 1992

[54] **TELEPHONE INTERFACE CALL PROCESSING SYSTEM WITH CALL SELECTIVITY**

[75] Inventor: **Ronald A. Katz**, Los Angeles, Calif.

[73] Assignee: **First Data Resources Inc.**, Omaha, Nebr.

[21] Appl. No.: **425,779**

[22] Filed: **Oct. 23, 1989**

Related U.S. Application Data

[63] Continuation-in-part of Ser. No. 312,792, Feb. 21, 1989, Pat. No. 5,073,929, which is a continuation-in-part of Ser. No. 194,258, May 16, 1988, Pat. No. 4,845,739, which is a continuation-in-part of Ser. No. 18,244, Feb. 24, 1987, Pat. No. 4,792,968, which is a continuation-in-part of Ser. No. 753,299, Jul. 10, 1985, abandoned.

[51] **Int. Cl.**[5] **H04M 11/00**

[52] **U.S. Cl.** **379/92**; 379/97; 379/142; 379/95

[58] **Field of Search** 379/92, 97, 207, 225, 379/127, 201, 211, 266, 265, 142, 95

[56] **References Cited**

U.S. PATENT DOCUMENTS

4,756,020	7/1988	Fodale	379/127
4,797,911	1/1989	Szlam et al.	379/92
4,922,522	5/1990	Scanlon	379/97

OTHER PUBLICATIONS

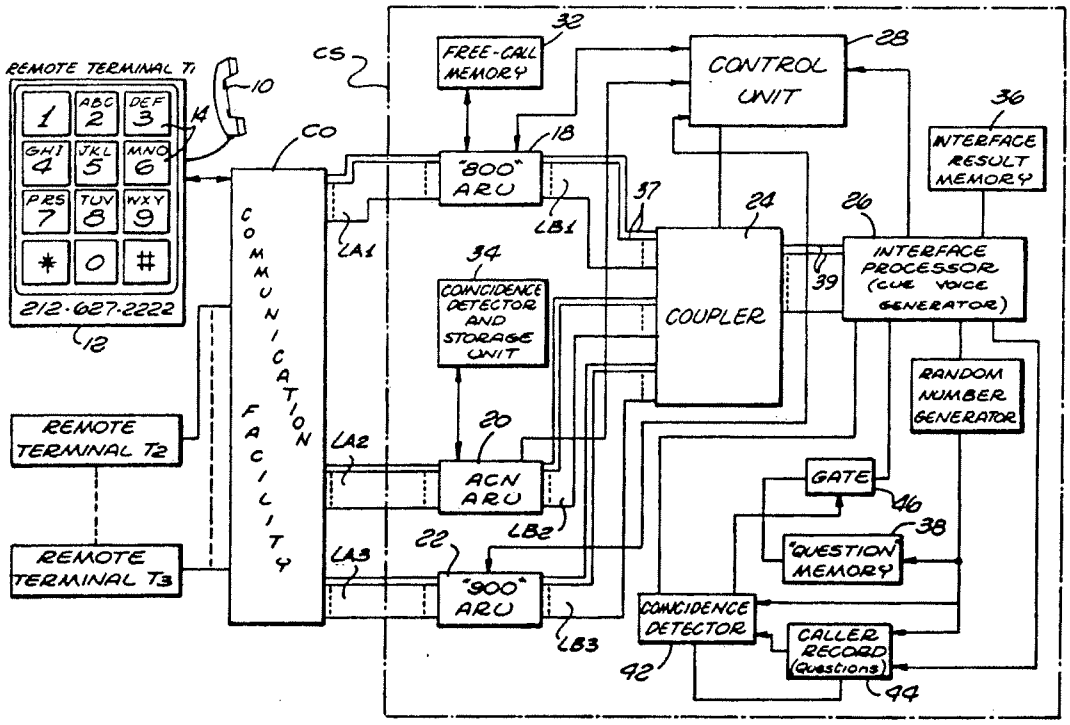
Int'l Pub. No. WO87/00375, Katz, "Statistical Analysis System for Use with Public Comm. Facility" Jan. 1987.

Primary Examiner—James L. Dwyer
Assistant Examiner—Stella L. Woo

[57] **ABSTRACT**

For use with a public telephone network CO incorporating a vast number of terminals T1-Tn, a system CS limits and controls interface access to implement voice-digital communication for statistical processing. The system CS accommodates calls in different modes, e.g. "800", "900" or area code and incorporates qualifying apparatus to restrict against caller misuse. Alternative calling modes are used to reach an interface facility that also affords some control based on calling terminal identification, e.g. as by ANI equipment.

23 Claims, 2 Drawing Sheets



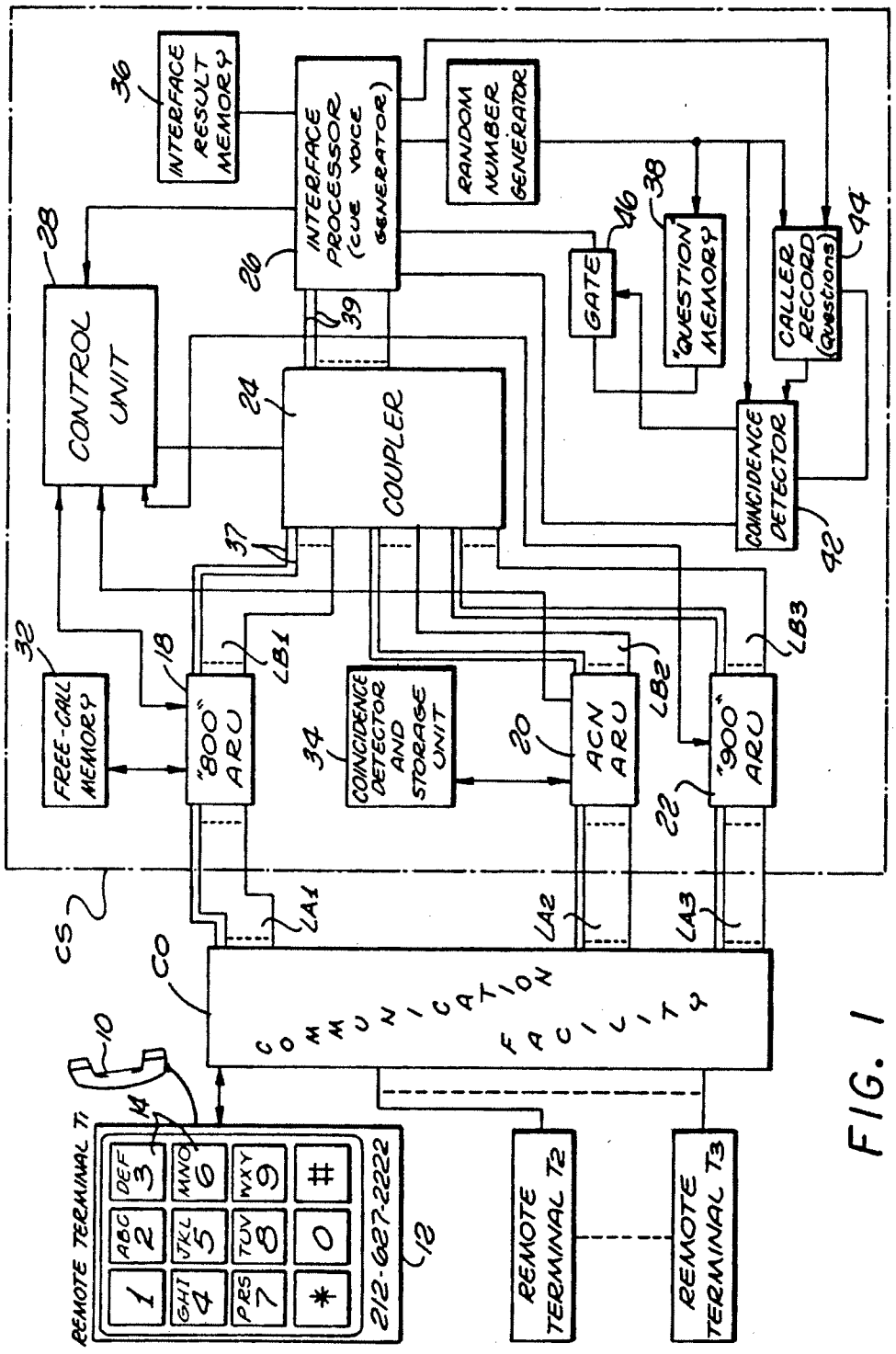

INTERFACE RESULT MEMORY
INTERFACE PROCESSOR (CUE VOICE GENERATOR)
RANDOM NUMBER GENERATOR
CONTROL UNIT
COUPLER
GATE
QUESTION MEMORY
CALLER RECORD (questions)
COINCIDENCE DETECTOR
FREE-CALL MEMORY
"800" ARU
COINCIDENCE DETECTOR AND STORAGE UNIT
ACN ARU
"900" ARU
COMMUNICATION FACILITY
REMOTE TERMINAL T1
212-627-2222
REMOTE TERMINAL T2
REMOTE TERMINAL T3

FIG. 1

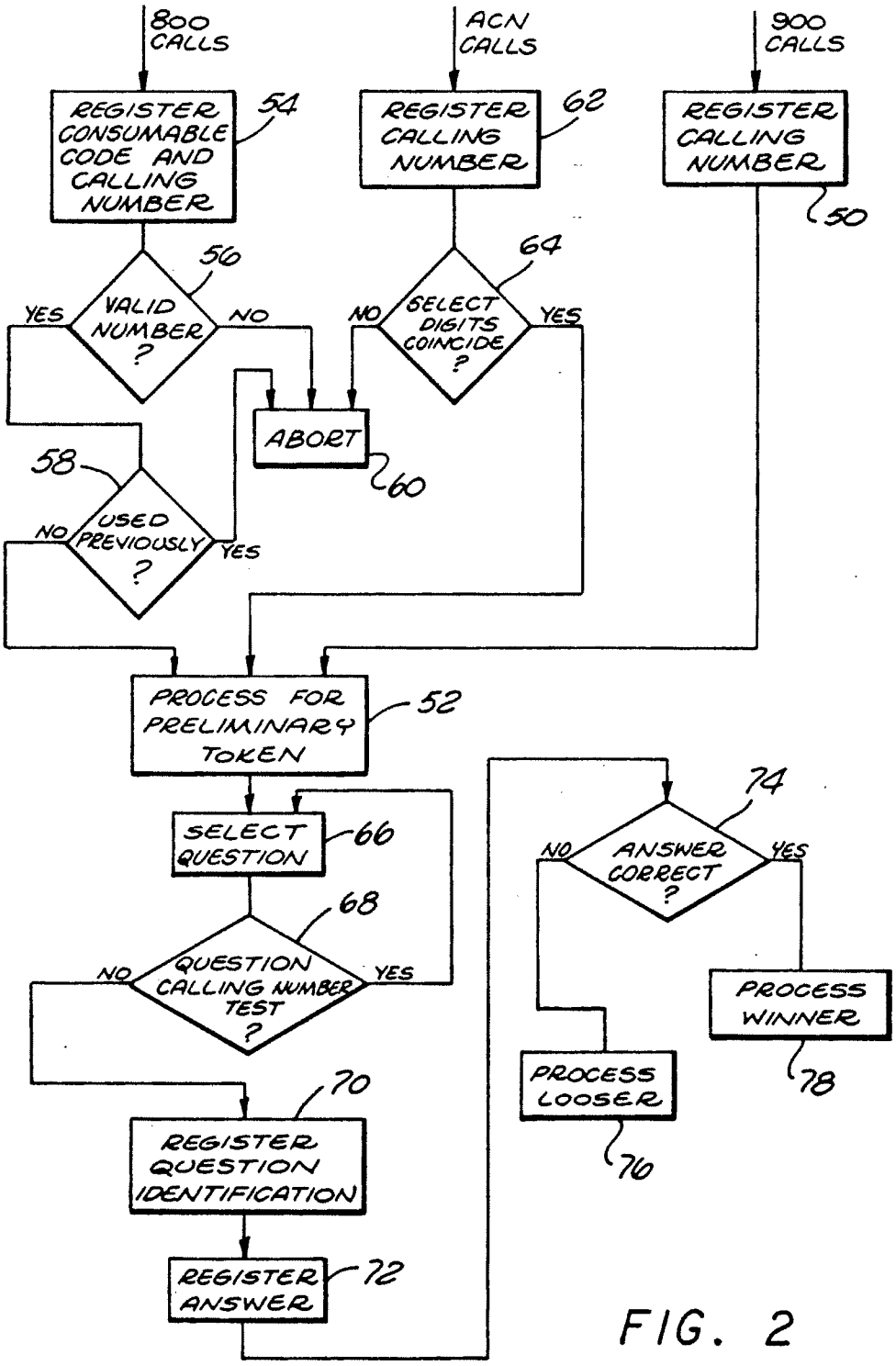

800 CALLS
ACN CALLS
900 CALLS
REGISTER CONSUMABLE CODE AND CALLING NUMBER
54
REGISTER CALLING NUMBER
62
REGISTER CALLING NUMBER
50
56
VALID NUMBER ?
YES
NO
64
SELECT DIGITS COINCIDE ?
NO
YES
ABORT
60
58
USED PREVIOUSLY ?
NO
YES
PROCESS FOR PRELIMINARY TOKEN
52
SELECT QUESTION
66
68
QUESTION CALLING NUMBER TEST ?
NO
YES
70
REGISTER QUESTION IDENTIFICATION
REGISTER ANSWER
72
74
ANSWER CORRECT ?
NO
YES
PROCESS LOOSER
76
PROCESS WINNER
78

FIG. 2

TELEPHONE INTERFACE CALL PROCESSING SYSTEM WITH CALL SELECTIVITY

RELATED SUBJECT MATTER

This is a continuation-in-part of application Ser. No. 312,792 filed Feb. 21, 1989, and entitled "Voice-Data Telephonic Control System," now U.S. Pat. No. 5,073,929, which was a continuation-in-part of application Ser. No. 194,258 filed May 16, 1988, and entitled "Telephonic-Interface Statistical Analysis System", now U.S. Pat. No. 4,845,739, which was a continuation-in-part of application Ser. No. 018,244 filed Feb. 24, 1987, and entitled "Statistical Analysis System for Use with Public Communication Facility", now U.S. Pat. No. 4,792,968, which was a continuation-in-part of application Ser. No. 753,299 filed Jul. 10, 1985, and entitled "Statistical Analysis System For Use With Public Communication Facility", now abandoned.

BACKGROUND AND SUMMARY OF THE INVENTION

Recent years have seen a considerable growth in the use of telephonic communications. For example, in various applications, telecommunications applications have expanded to accommodate voice-digital interfaces between computer apparatus and callers at remote telephone terminals. For example, by actuating the push buttons at a remote telephone terminal, a caller controls a computer apparatus to provide various entertainment or information. In using such a system, a caller might telephone a financial service and selectively actuate the telephone key panel to receive information on specific stocks or bonds.

Digital interface systems also have been implemented to utilize digital signals provided independently of the caller's actions. For example, the so-called "ANI" telephone equipment provides digital signals indicating a caller's telephone number. Equipment designated "DNIS" is similarly available to indicate the called number. Thus, digital signals may be provided telephonically to a system associated with individual calling terminals as for identification or other use.

Telephonic games and contests are among the various applications that have been recognized for implementation with telephone interface systems. Such games and contests may be variously presented, as in cooperation with an advertising program for a product or in a lottery format. Generally with respect to such applications, various call modes might be utilized.

Essentially, three telephonic calling modes or services are in widespread use. Specifically, caller-charge or "900" service (including "976" calls) involves a charge to the caller for each call. The "900" calling mode is useful for implementing games and contests with telephone interface systems; however, certain problems are encountered. Specifically, certain telephone terminals, e.g. pay phones, do not accommodate "900" service. Also, with respect to certain forms of games and contests, it is important to offer members of the public an alternative "free" method of participation. In general, the system of the present invention may be employed to implement "900" calling modes while accommodating "free" participation with reasonable control.

Telephone calls may be accommodated without charge using "800" service or calling mode. Generally, the "800" calling mode accommodates free calls by

callers in various areas to a particular station incurring the charges. In most applications, it is important to regulate the use of the "800" calling mode. Another calling mode is the traditional method of calling, involving area-code numbers which also includes calls placed within a given area code which do not usually involve a specific charge and usually do not require dialing the area code. One of the problems associated with using the area-code calling mode for interface systems is the vast number of calls. For example, even in association with an advertising campaign, inviting members of the general public to participate in a free contest or game by telephone may prompt an overwhelming response. Accordingly, a need exists for a practical system to control and limit calls to an interface service in the traditional free area-code number mode.

Another aspect of telephonic-interface contests involves zealous or obsessive participants. For example, in a quiz contest, a zealous person might call repeatedly, researching answers to given questions until ultimately a question is repeated. At that time, the caller is ready with an answer and has an unfair advantage in the contest. Thus, a need exists for control within the interface system.

In general, the system of the present invention involves a telephone call processing system for receiving calls from a multitude of terminals in different call modes and for processing calls, as to a game or contest format, with means to limit repeat-call advantages. In a disclosed form, the system implements three calling modes to facilitate various formats while accomplishing certain protection both with regard to the calling mode and contest formats.

BRIEF DESCRIPTION OF THE DRAWINGS

In the drawings, which constitute a part of this specification, exemplary embodiments exhibiting various objectives and features hereof are set forth, specifically:

FIG. **1** is a block diagram of a system constructed in accordance with the present invention; and

FIG. **2** is a flow diagram of an operating format of the system of FIG. **1**.

DESCRIPTION OF THE ILLUSTRATIVE EMBODIMENT

As required, a detailed illustrative embodiment of the present invention is disclosed herein. However, telephone techniques, physical communication systems, data formats and operating structures in accordance with the present invention may be embodied in a wide variety of forms and modes, some of which may be quite different from those of the disclosed embodiment. Consequently, the specific structural and functional details disclosed herein are merely representative, yet in that regard, they are deemed to afford the best embodiment for purposes of disclosure and to provide a basis for the claims herein which define the scope of the present invention.

Referring initially to FIG. **1**, a series of remote terminals T1-TN (telephone instruments) are represented (left). The terminals T1-TN may be functionally similar and accordingly only the terminal T1 is shown in any detail. The indicated terminals T1-TN represent the multitude of telephone terminals existing in association with a communication facility CO which may comprise a comprehensive public telephone network.

The communication facility CO, accommodating the individual terminals T1-TN, is coupled to a central processing station CS generally indicated within a dashed-line block. In the station CS, to illustrate operating aspects of the present invention, calls are selectively accepted and interfaced so as to accomplish a desired operating format, for example a contest or game.

Generally, calls from the individual terminals T1-TN might be in any of three modes, i.e. the "800" mode, the "900" mode or the area-code mode (traditional area code plus number or local number dialing). In the disclosed illustrative system, depending on individual calling modes, calls are selectively accepted for interface processing. Generally, the interface format accommodates "900" calls with supplemental "800" calls to accommodate both "free" access and all types of telephone terminals. In the disclosed embodiment, calls in the "800" mode are restricted in accordance with prearranged limitations. Furthermore, calls in the area-code mode (from all areas), the 800 mode and 900 mode may be limited to callers having a station number containing a predetermined digit sequence. For example, calls might be restricted to those from terminals having a telephone number ending in the digits "234".

The processing station CS also is controlled to limit the effectiveness of zealous callers. For example, in a contest format, callers may be quizzed with questions randomly drawn from an inventory. In accordance herewith, questions are not repeated to individual telephone terminals T1-TN. Thus, some control is imposed on an aggressive caller who might otherwise be given two opportunities to answer the same question.

Considering the system of FIG. 1 in greater detail, the exemplary telephone terminal T1 includes a handpiece 10 (microphone and earphone) and a panel 12 provided with a rectangular array of individual push buttons 14 in a conventional configuration. Of course, the handpiece 10 accommodates analog siganls while the panel 12 is a digital apparatus. During an interface operation, as disclosed in detail below, the caller is queued or prompted vocally through the handpiece 10 (earphone) to provide digital responses using the buttons 14.

At this stage, some specific aspects of the communication interface are noteworthy. Essentially, as a result of telephonic dialing at one of the terminals T1-TN, the communication facility CO couples the select terminal to an audio response unit. Specifically, to illustrate various aspects, three separate audio response units are provided in the station CS to accept calls in the three distinct modes. That is, an audio response unit 18 receives calls in the "800" mode. An audio response unit 20 receives calls in the area-code dialing mode, and an audio response unit 22 receives calls in the "900" dialing mode.

It will be understood that although three separate audio response units are illustrated, systems incorporating the principles of the present invention may well incorporate various numbers of audio response units for each calling mode, with each audio response unit having the capability to accommodate a substantial number of calls as indicated by the lines from the communication facility CO in FIG. 1. Alternatively, a single composite unit might be utilized. Also, the mode or aspects of the described embodiment might well be implemented singly or in various combinations. Herein, for purposes of explanation, calls are treated individually and processed accordingly through the three audio response units 18, 20 and 22.

Generally, the audio response units 18, 20 and 22 connect callers at remote terminals T1-TN from the communication facility CO through a coupler 24 (FIG. 1, station CS, center) to an interface processor 26. Both the coupler 24 and the processor 26 are connected to a control unit 28 that is also connected to the audio response units 18, 20 and 22. Accordingly, with overall supervision by the control unit 28, the audio response units 18, 20 and 22 answer and preliminarily qualify callers from the terminals T1-TN for connection through the coupler 24 to the interface processor 26.

Upon completion of an interface connection in the disclosed embodiment, a contest format is executed by vocally prompting callers to respond with digital data. At this point, it is noteworthy that the communication facility CO also provides identification signals to the audio response units 18, 20 and 22. Specifically, digital identification signals representing numbers associated with the calling terminals T1-TN are provided by "ANI" equipment independent of any action by the caller. In the event "ANI" equipment is not available, callers may be vocally prompted to provide the digital representations by selectively depressing the buttons 14.

The telephone communication facility CO also may provide digital signals indicating the called number. Generally, such a capability involves equipment designated "DNIS". The capability may be useful in various embodiments of the present system, as to distribute calls from a single equipment as mentioned above.

Pursuing the exemplary structure of FIG. 1 in still greater detail, the communication facility CO provides three sets of trunks or lines LA1, LA2 and LA3 respectively coupled to the audio response units 18, 20 and 22. From the audio response units 18, 20 and 22, sets of lines LB1, LB2 and LB3 are connected to the coupler 24. Under control of the control unit 28, the coupler 24 connects individual lines 37 of the sets LB1, LB2 and LB3 to the processor 26 through lines 39.

Generally, the audio response units 18, 20 and 22 may take the form of well known telephonic structures with the capability to "answer" calls and interface callers in a preliminary way. Each of the units 18, 20 and 22 incorporate a voice generator along with some basic programmable logic capability.

The audio response unit 18 is coupled to a free-call memory 32. Generally, the unit 18 in cooperation with the memory 32 operates with the control unit 28 to qualify acceptable calls in the "800" mode.

The audio response unit 20 is connected to a select-number coincidence detector 34. These structures along with the control unit 28 test area-code mode calls. The audio response unit 22 accepts calls without initial qualification.

The system of the disclosed embodiment selectively qualifies callers depending on their calling mode. Additionally, the system responds to caller identification to enhance contest equity. Generally, the interface processor 26 poses questions to calling contestants and stores the resulting answers in a result memory 36. Questions given to contestants are selected from a memory 38 by a random number generator 40. Essentially, the memory 38 contains an inventory of questions addressable by numbers provided by the random number generator 40. The address numbers from the generator 40 are also supplied to a coincidence detector 42 that also receives the address numerals of questions previously presented

to a specific caller from a record **44**. Thus, before a question is presented to a caller, the number of the calling terminal is checked to assure that the same question has not previously been posed to a caller at that terminal.

If the coincidence detector **42** clears the current question as not being repetitive, a gate **46** is qualified and the question is supplied from the memory **30** to the interface processor **26**. A voice generator within the interface processor **26** then provides signals through a designated line **39**, the coupler **24**, a line **37**, one of the audio response units and the communication facility CO to the connected remote terminal. As a result, the caller hears a simulated voice question. The answer is provided by the caller actuating the buttons **14** at the calling terminal. In that regard, the question may be in a multiple choice or true-false format to accommodate simple push button actions at the terminal.

In view of the above description of structural elements in the disclosed embodiment, a comprehensive understanding of the system may now best be accomplished by assuming certain operating conditions and describing the resulting operations. Accordingly, assume that the system CS is programmed to accommodate a relatively simple game format, that is, a sponsored contest for the promotion of a product, e.g. the XYZ Widget. Further assume the contest is of limited participation based either upon: the payment of a token fee ("900" calling mode), prearranged participation ("800" calling mode), lottery selection (area-code calling mode) or lottery selection in combination with either 800 or 900 calling modes. Considering exemplary possibilities of the format, the XYZ Widget might be advertised with an invitation to participate via the "900" calling mode. Alternatively, participants might be variously qualified as by select notification; however, in the exemplary format, such participants would incur a token charge imposed through "900" telephonic service. To consider an example, an offering might be stated: "If your last three phone digits are 972 you may call, 1) if you wish, call 1 900 XXXX972 ($0.95 service charge) provided your last three phone digits are 972; 2) if you have written in for a 'free to enter' you can use the one-time PIN number provided your last three phone digits are 972. In this case you can use the 'free' 800 number provided to you with your PIN number."

As indicated above, some telephone terminals do not accommodate "900" calling mode. Also, under certain circumstances, it is important to afford members of the public "free" access to participate in various games or contests. For example, such participation might be arranged by mail or other communication to provide a participant with a limited-use (i.e. one) qualification number. With use, the numbers are stored in the memory **32** and the list is checked subsequently to avoid repeat use.

A third class of contest participants might be considered lottery winners. For example, the sponsor might televise a drawing of three decimal digits to provide a sequence of three numbers. The three numbers might identify "winning" or "entitled" participants by corresponding to the last three numbers (digits) of their telephone number. For example, the drawing of the numbers "257" would entitle a single call participation from any of the telephone terminals T1–TN designated by a number, the last three digits of which are "257".

In an exemplary contest format, participants might be asked a few test questions (for minor prizes and the ability to participate in a lottery). Of course, a vast variety of possibilities exist; and in that regard, interim prizes may be awarded to participants as the format proceeds from the initial call to the ultimate prize. At the present point, it is important to appreciate that the system accommodates participants using various telephone call modes with select qualification to participate in an interface format utilizing voice prompt and push-button digital communication. In accordance with the described example, the sponsor invites participants to enter using "900" calling mode service. As a part of such an invitation, persons are advised that "free" entry or participation may be gained by sending a self-addressed envelope to receive an entry number, e.g. eight digits, for use via "800" calling mode service. In the disclosed embodiment, the eight-digit numeral is coded for verification. Of course, numerous possibilities exist. As a simple example the second and sixth digits of the number might have a specific sum, e.g. seven or seventeen. That is, the second and sixth digits might be: three and four, five and two, six and one, seven and zero, nine and eight and so on. A qualifying number would be: "34726313", the second and sixth digits being four and three, respectively.

With the arrangements completed for calling entries in the "900" and "800" mode, the contest might operate for several days before being opened to area-calling participants. That is, the area-calling mode might be available only after a televised drawing entitling participation from a select group of telephone numbers for a limited period of time.

In view of the above assumptions and descriptions, consider now the operation of the system as depicted in FIG. **1** in relation to the process diagram of FIG. **2**. That is, assume the system of FIG. **1** is implemented and programmed to accommodate the exemplary operations as will now be described with reference to the process diagram of FIG. **2**.

First, suppose a caller at the terminal T1 places a call in the "900" mode in response to an advertisement by a sponsor promoting XYZ Widgets. Perhaps the caller will receive at least a token gift and might qualify for a major lottery prize.

The assumed call involves the caller actuating the buttons **14** as for example to input: "1 900 5558945". As a result, signals are provided to the communication facility CO resulting in a connection from the remote terminal T1 to the audio response unit **22**. With the connection, the communication system CO also provides the audio response unit **22** with digital identification signals representative of the designation for remote terminal T1 ("212 627 2222"). The identification signals are provided by the ANI equipment within the communication facility CO and are registered by the audio response unit **22**. The operation is illustrated as a process step in FIG. **2** by the block **50** (upper right) for "900" mode calls.

As suggested above, it may be desirable for a format to provide a token award to all callers in the "900" mode. Recognizing such particulars as possibilities, in the disclosed embodiment, calls in the "900" mode are passed through the audio response unit **22** (FIG. **1**) and the coupler **24** to the interface processor **26**. Accordingly, the interface processor **26** receives the calling number and processes the contest format as described in detail below.

The initial step of the format common to all call modes is represented by the block **52** in FIG. **2**. How-

ever, as calls in all modes are processed similarly from that point, before proceeding with the explanation, the preliminary operations attendant other calling modes first will be explained.

As explained above, certain accommodations are made for participation in the "800" (caller free) mode. Accordingly, assume a caller at the terminal T1 has been given an identification number: "34726313" for use in the "800" mode. Accordingly, the caller dials a number, e.g. "800 555 3478", actuating the terminal T1 and the communication facility CO to provide a connection with the audio response unit 18. With communication, the audio response unit actuates an internal voice generator prompting the caller to key in his assigned number, "34726313". As the digits of the number are keyed in by the caller, they are supplied from the audio response unit 18 to the control unit 28 and the free-call memory 32.

Within the control unit 28, logic is provided for verifying the identification number as proper. In accordance with the simple example explained above, the control unit 28 would simply sum the second and sixth digits to test for a total of "7". The coincidence test is represented by the query block 56 in FIG. 2. As indicated above, various codes and verification techniques are well known along with the apparatus for verifying assigned numbers.

If the control unit 28 validates the qualification number "34726313", it is recorded in the free-call memory 32 for future checking against repeat use. Accordingly, each call in the "800" mode also involves a check or test from the audio response unit 18 to the memory 32 to determine whether or not the assigned qualification number has been previously used. The previous-use test is illustrated as a process step by the query block 58 in FIG. 2.

If the control unit 28 determines the qualification number to be invalid or the memory 32 reveals the number has been previously used, the communication is aborted by the audio response unit 18. For example, the audio response unit 18 may be actuated to provide simulated audio signals carrying a message terminating the communication. For example, the caller might be advised: "The number you have provided is not valid. Consequently, your participation cannot be accepted on that basis."

If the entered number is valid and has not been previously used, the tests indicated by the query blocks 56 and 58 (FIG. 2) are positive and the process again proceeds to the common step as indicated by the block 52, e.g. as to receive a token gift.

As indicated above, a third possibility for contest participation involves calling in the area-code mode. While numerous format possibilities exist, as suggested above, access for callers in the area-code mode might be limited to a relatively short period of time. For example, a television program advertising the XYZ Widget might include a drawing to select the telephone terminals from which callers may participate for a period of twenty-four hours. As indicated above, the drawing might identify the last three digits of telephone numbers for the approved terminals.

Following a relatively short time (e.g. one day) during which area-code callers may enter the contest, the contest might be concluded with the ultimate winner or winners determined. In any event, assume the presence of a caller at the terminal T2 with an approved telephone number, i.e. "212 627 2257". Somewhat as explained above with respect to other calling modes, keying operations by the caller at the remote terminal T2 result in a connection through the communication system CO to the audio response unit 20. As previously, the communication facility CO provides digital signals to the audio response unit 20 indicating the calling number (ANI). Thus, the calling number is registered as indicated by the block 62 in FIG. 2. As previously, in the event ANI equipment is not operative to serve the remote terminal T2, then the caller may be asked to key in his telephone number for subsequent verification.

From the audio response unit 20, the caller's number is supplied to the coincidence detector and storage unit 34 for a two-stage test. A first test simply seeks a coincidence between the approved number sequence (three digits) and the last three digits of the calling number. In the example, the last three digits of the calling number ("257") are compared with the select digit sequence, "257". The test is indicated by the query block 64 in FIG. 2.

As a secondary test, the unit 34 may check a record of previous use. Thus, the unit 34 simply implements test logic to accomplish these comparison-step operations with structures as well known in the prior art.

If the tests are negative, as indicated by the query block 64, the communication is aborted as indicated by the block 60. Alternatively, a favorable test again directs the system to proceed to the step of block 52 at which the process enters a common phase for all calling modes.

With the entry of a call into the common phase, the line carrying the call is connected through the coupler 24 (FIG. 1) to the interface processor 26. That is, depending on the call mode, the call is passed through one of the audio response units 18, 20 or 22 and the coupler 24 to the interface processor 26. Note that as indicated above, each of the audio response units 18, 20 and 22 is capable of accommodating a large number of asynchronous calls. Similarly, the coupler 24 is capable of connecting lines from the audio response units 18, 20 and 22 (LB1, LB2 and LB3 respectively) to the interface processor on an individual basis through lines 37 and 39.

The interface processor 26 may comprise a relatively substantial computing capability for processing many individual calls with programmed variations. The processing operation is illustrated in FIG. 2 beginning with the block 52. However, note that as the interface processor 26 receives the telephone number identifying a calling terminal (ANI) reference may be made to a data bank. Therefore, the operation might involve reference to substantial data on a caller. Accordingly, a basis exists for several process variations accommodated by data from a bank. The block 52 represents such possibilities as well as further informing or processing callers.

With the receipt of a call at the interface processor 26, a voice generator may be actuated to specifically inform a caller, depending upon the specific format employed. Essentially, digital signals are provided to actuate a voice generator within the processor 26. Accordingly, an audio message is provided through the coupler 24, the associated audio response unit, and the communication facility CO to the connected remote terminal. Thus, the caller may be further informed or cued.

In the disclosed embodiment, concurrently with the operation of further informing the caller, the interface processor 26 actuates the random number generator 40 to provide a random address for the question memory

38. The process step is illustrated in FIG. 2 by the block 66.

The random number (identifying a question in the memory 38) is also provided to the coincidence detector 42 to test for the previous use of the question to the calling terminal. In that regard, the interface processor 26 provides the caller telephone number (ANI) to the caller record 44 which may simply take the form of a look-up table addressed by calling numbers and revealing the identification of previous questions propounded. The addresses of questions previously recorded for a calling number are supplied to the coincidence detector 42 for comparison with the current tentative question identification number. The process step is illustrated by the query block 68 in FIG. 2.

If the tentative question has been previously used for the calling terminal, a signal is provided from the coincidence detector 42 to the interface processor prompting a repeat operation by the random number generator 40 to select another question.

Alternatively, if the tentative question is not a repeat, then the coincidence detector 42 qualifies the gate 46 and the tentative question is supplied to the interface processor 26 for actual use. Note that upon the occurrence of an approved question, the coincidence detector also supplies a signal to the call record 44 which records the identification number of the question. The process step is illustrated in FIG. 2 by the block 70.

With the provision of signals representing a question through the gate 46 to the interface processor 26, the internal voice generator is actuated to propound the question to the caller. Recognizing the vast possibilities for contest formats, one or more rather difficult questions might be propounded to isolate lottery participants. Alternatively, a relatively easy question may be propounded as a minor obstacle to participation in the final phase of the contest. In any event, as prompted or cued, the caller responds using the buttons 14 and the response is registered for testing within the interface processor 26. The process steps are indicated by the block 72 and the query block 74 in FIG. 2. The results of the tests are then stored in the interface result memory 36. Note that in the interests of human perception, a printed record may be developed concurrently with the qualification of lottery participants.

Final processing to determine a winner or winners may involve any of various operations as a drawing, an event, and so on. Accordingly, as indicated by the blocks 76 and 78, final determinations are made of winners and losers with predetermined prize allocations. Thus, the system of the present invention enables effective regulation and control of interfaces between persons at telephone stations and a central processing apparatus. Calls in various modes are accommodated with appropriate tests, and interface data (e.g. test questions) are qualified.

In view of the above descriptions, it will be apparent that the disclosed embodiment is susceptible to considerable modification in the implementation of the present invention in conjunction with a telephone system to accommodate caller interface operations. Although the disclosed embodiment is directed to a contest, it will be apparent that aspects of the system may be variously embodied to accommodate any of a variety of telephone interface operations. Furthermore, it will be apparent that while the disclosed embodiment comprises specific elements and configurations, any of a variety of structures might well be utilized. Accordingly, the scope hereof is deemed to be as set forth in the claims below.

What is claimed is:

1. A telephone call processing system for receiving calls from a multitude of terminals in different call modes including an "800" call mode and a "900" call mode for processing to an interface format and involving digital signals associated with said terminals as for identification or data, said system comprising:

first response unit means for receiving calls in said "800"call mode;

qualification means for qualifying said calls in said "800" call mode received by said first response unit to provide qualified calls;

second response unit means for receiving calls in a second call mode;

means for processing calls in an interface format; and

means for coupling said qualified calls and said calls in a second mode to said means for processing.

2. A system according to claim 1 wherein said second response unit is coupled to receive calls in said "900" call mode.

3. A system according to claim 2 wherein said qualification means comprises a test structure, for testing said digital signals associated with said terminals originating said calls in said "800" call mode.

4. A system according to claim 1 wherein said qualification means comprises means for testing said digital signals associated with said terminals originating said calls.

5. A system according to claim 4 further including a free-call memory structure tallying said digital signals associated with said "800" call mode and wherein said means for testing tests the content of said memory structure.

6. A system according to claim 5 wherein said second response unit is coupled to receive calls in said "900" call mode.

7. A system according to claim 5 wherein said qualification means comprises means for testing select digits of said digital signals associated with said terminals originating said calls in said 800 call mode.

8. A system according to claim 1 wherein said qualification means includes means for testing select digits of said digital signals associated with a calling terminal for identification.

9. A system according to claim 8 wherein said means for processing includes means for selecting interface questions for caller sand record means for recording selected interface questions in association with said digital signals for identification.

10. A telephone call processing system for receiving calls from a multitude of terminals for processing to an interface format and involving digital signals associated with said terminals as for identification or data, said system comprising:

cue means for prompting question responses from said terminals in the form of digital signals as data;

question selection means for selecting individual questions from a plurality of questions for actuating said cue means;

call record memory means for storing identified questions cued to said terminals, addressable by said digital signals associated with said terminals for identification;

test means for testing individual questions selected by said question selection means against questions

from said call record memory means to detect coincidence; and

control means coupled to said cue means, said selection means, said memory means and said test means, said control means for sequencing operations to select a question, test the selected question and either actuate said cue means or select another question under control of said test. said control means also including a gate structure for inhibiting the cue means in the event of selecting a question of record in said call record memory means.

11. A telephone call processing system according to claim **10** further including processing means for processing said digital signals as data.

12. A system according to claim **11** wherein said memory means stores the last three digits of numbers associated with acceptable terminals for identification and thereby controls said processing means based on acceptance of said calls.

13. A system according to claim **12** wherein at least three digits are tested based on ANI data received by said system.

14. A system according to claim **10** wherein the memory means further stores complete phone numbers in memory to prevent duplicate use.

15. A telephone interface system for individually interfacing callers at a multitude or remote terminals for voice-digital communication through a telephone communication facility, said system comprising:

communication means for establishing telephone communication with currently active callers at certain of said terminals through said telephone communication facility;

means for providing identification signals to said communication means indicative of said currently active callers, said means for providing identification signals comprising means for providing at least a portion of the digits associated with a remote terminal for identification;

memory means for storing caller cues and use indications for said caller cues in relation to said callers as identified by said identification signals;

cue means for receiving said caller cues to provide voice signals through said communication means to prompt responses from said currently active of said callers in the form of digital data signals; and

means for selecting a current caller cue from said memory means for one of said currently active callers for application to said cue means under control of said identification signals for said one of said currently active callers and said use indications in said memory means for said one of said currently active callers.

16. A system according to claim **15** wherein said means for providing at least a portion of the digits includes means for receiving automatic number identification (ANI) signals.

17. A telephone interface system for individually interfacing callers at a multitude of remote terminals for voice-digital communication through a telephone communication facility, said system comprising:

communication means for establishing telephone communication with currently active callers at certain of said terminals through said telephone communication facility;

means for providing identification signals to said communication means indicative of said currently active callers;

memory means for storing caller cues and use indications for said caller cues in relation to said callers as identified by said identification signals;

cue means for receiving said caller cues to provide voice signals through said communication means to prompt responses from said currently active of said callers in the form of digital data signals; and

means for selecting a current caller cue from said memory means for one of said currently active callers for application to said cue means under control of said identification signals for said one of said currently active callers and said use indications in said memory means for said one of said currently active callers, said means for selecting including means for addressing said memory means to provide a possible caller cue with use indications and coincidence means for testing said use indications for said possible caller cue against said identification signals for said one of said currently active callers.

18. A system according to claim **17** wherein said means to provide a possible caller cue includes a random number generator for addressing said memory means.

19. A telephone interface system for individually interfacing callers at a multitude of remote terminals for voice-digital communication through a telephone communication facility, said system comprising:

communication means for establishing telephone communication with currently active callers at certain of said terminals through said telephone communication facility;

means for providing identification signals to said communication means indicative of said currently active callers;

memory means for storing caller cues and use indications for said caller cues in relation to said callers as identified by said identification signals;

cue means for receiving said caller cues to provide voice signals through said communication means to prompt responses from said currently active of said callers in the form of digital data signals; and

means for selecting a current caller cue from said memory means for one of said currently active callers for application to said cue means under control of said identification signals for said one of said currently active callers and said use indications in said memory means for said one of said currently active callers, said means for selecting including means to reject a caller cue indicated to have been used for a currently active caller.

20. A telephone interface system for individually interfacing callers at a multitude of remote terminals for voice-digital communication through a telephone communication facility, said communication facility providing number identification (ANI) signals indicative of the number for a calling remote terminal, said system comprising:

preliminary communication means for establishing preliminary telephone communication with callers at said terminals to receive said number identification (ANI) signals;

memory means for storing at least one predetermined sequence of select digits representative of only a portion of at least one of the numbers for identifying remote terminals

means for testing said predetermined sequence of select digits against a select portion of a number for

a calling terminal as represented by said number identification (ANI) signals for a current caller to provide a control signal; and

means for accepting calls for interface communication beyond said preliminary telephone communication from said terminals in accordance with said control signal.

21. A telephone interface system according to claim **20** wherein said preliminary communication means comprises an audio response unit.

22. A telephone interface system according to claim **20** wherein said preliminary communication means comprises a response unit for receiving "800" mode calls.

23. A telephone call processing system for receiving calls from a multitude of terminals for processing in a lottery interface format wherein callers are cued by synthesized voice signals supplied to said terminals and respond with digital signals, as by actuating push buttons at said terminals, said system comprising:

means for selectively receiving calls from said multitude of terminals to establish telephone communication with a select subset of callers, said means for selectively receiving calls comprising means for receiving calls in a plurality of calls modes including an "800" calling mode;

means for providing identification signals for said callers of said select subset;

means for individually cuing said callers of said select subset to promote digital signals for processing to isolate a sub-subset of said callers; and

means for storing identification signals for said callers of said sub-subset.

* * * * *

EXHIBIT 4

US005251252A

United States Patent [19]

Katz

[11] Patent Number: 5,251,252

[45] Date of Patent: * Oct. 5, 1993

[54] TELEPHONE INTERFACE CALL PROCESSING SYSTEM WITH CALL SELECTIVITY

[75] Inventor: Ronald A. Katz, Los Angeles, Calif.

[73] Assignee: First Data Resources Inc., Omaha, Nebr.

[*] Notice: The portion of the term of this patent subsequent to Jul. 7, 2009 has been disclaimed.

[21] Appl. No.: 779,762

[22] Filed: Oct. 21, 1991

Related U.S. Application Data

[63] Continuation of Ser. No. 425,779, Oct. 23, 1989, Pat. No. 5,128,984, which is a continuation-in-part of Ser. No. 312,792, Feb. 21, 1989, Pat. No. 5,073,929, which is a continuation-in-part of Ser. No. 194,258, May 16, 1988, Pat. No. 4,845,739, which is a continuation-in-part of Ser. No. 18,244, Feb. 24, 1987, Pat. No. 4,792,968, which is a continuation-in-part of Ser. No. 753,299, Jul. 10, 1985, abandoned.

[51] Int. Cl.[5] H04M 11/00

[52] U.S. Cl. 379/92; 379/95; 379/97; 379/142

[58] Field of Search 379/92, 97, 207, 225, 379/127, 201, 211, 266, 265, 142, 95

[56] References Cited

U.S. PATENT DOCUMENTS

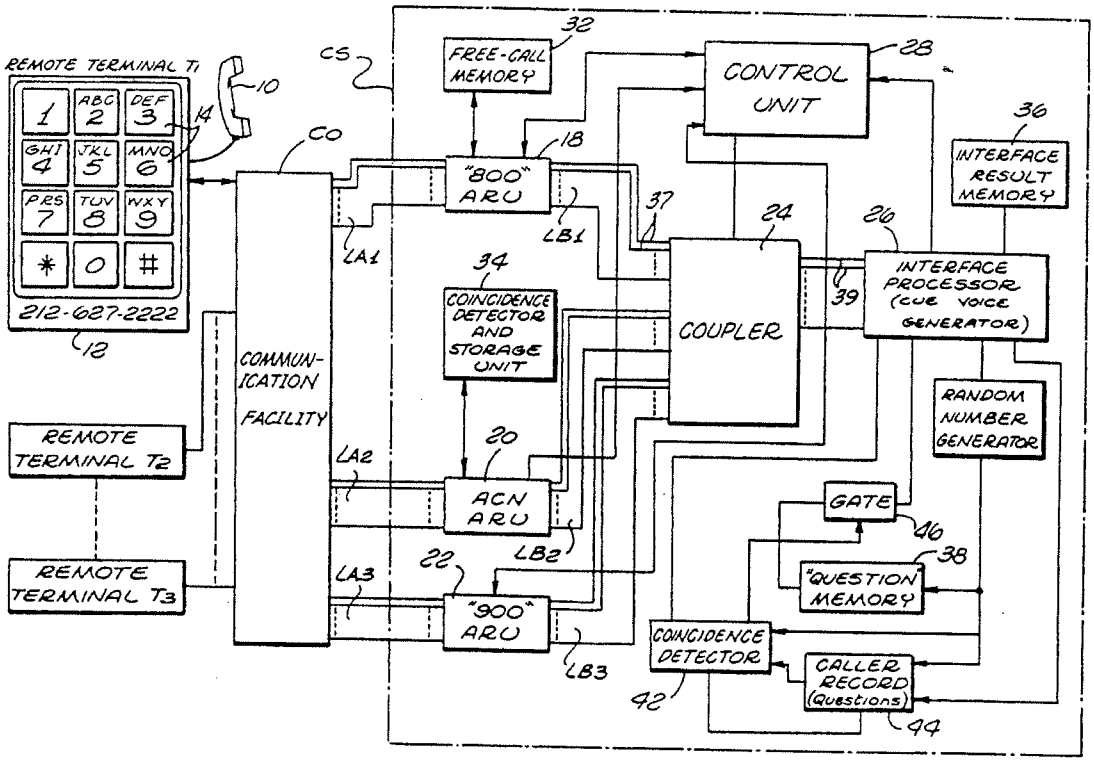
4,797,911 1/1989 Szlam et al. 379/92
4,922,522 5/1990 Scanlon 379/97

Primary Examiner—Jin F. Ng
Assistant Examiner—Stella L. Woo

[57] ABSTRACT

For use with a public telephone network CO incorporating a vast number of terminals Tl-Tn, a system CS limits and controls interface access to implement voice-digital communication for statistical processing. The system CS accommodates calls in different modes, e.g. "800", "900" or area code and incorporates qualifying apparatus to restrict against caller misuse. Alternative calling modes are used to reach an interface facility that also affords some control based on calling terminal identification, e.g. as by ANI equipment.

18 Claims, 2 Drawing Sheets



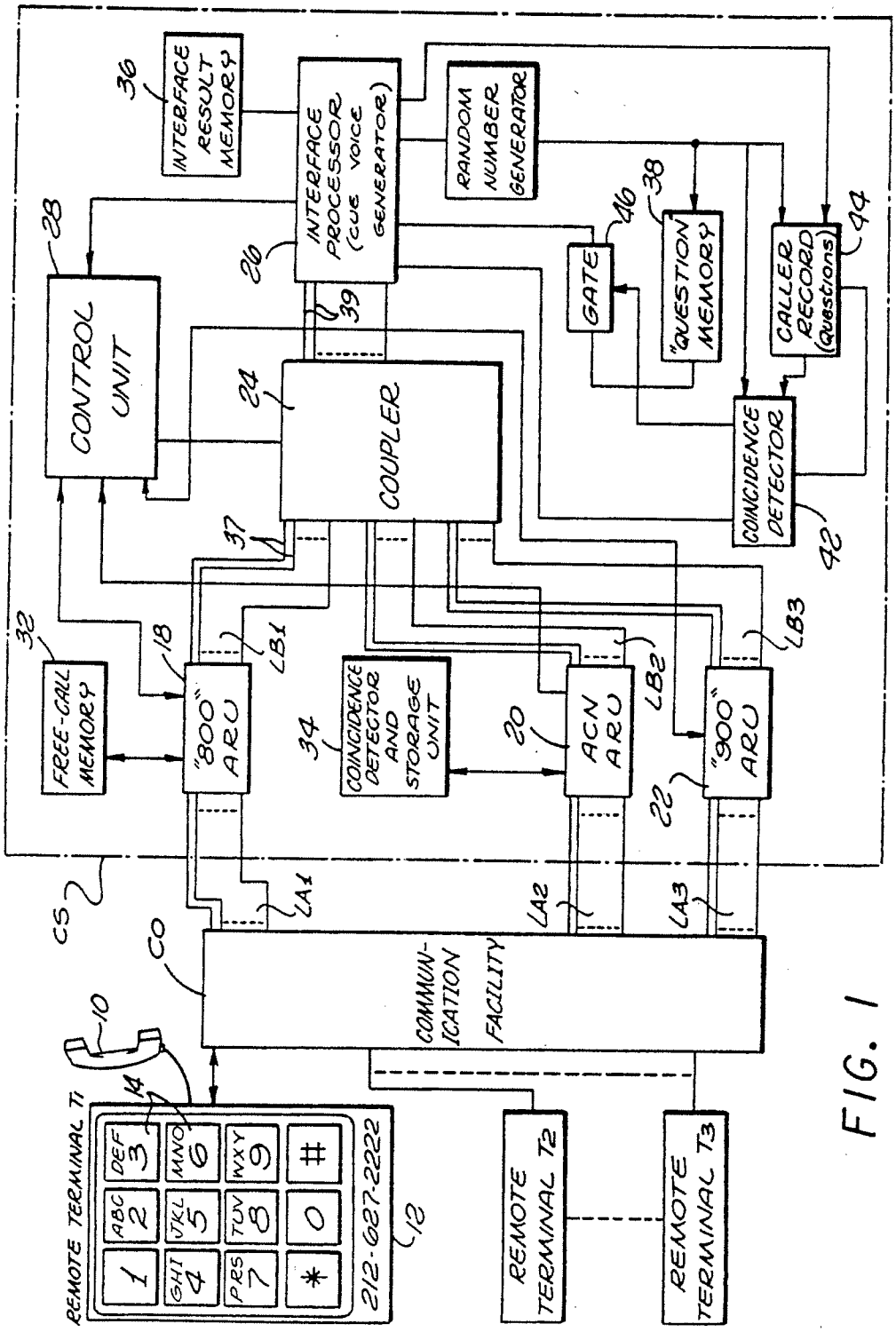

INTERFACE RESULT MEMORY
INTERFACE PROCESSOR (CUE VOICE GENERATOR)
RANDOM NUMBER GENERATOR
CONTROL UNIT
COUPLER
GATE
"QUESTION" MEMORY
CALLER RECORD (Questions)
COINCIDENCE DETECTOR
FREE-CALL MEMORY
"800" ARU
COINCIDENCE DETECTOR AND STORAGE UNIT
ACN ARU
"900" ARU
COMMUN-ICATION FACILITY
REMOTE TERMINAL T1
REMOTE TERMINAL T2
REMOTE TERMINAL T3
212-627-2222
36
28
26
39
24
46
38
44
37
42
32
18
L81
L83
34
20
L82
22
CS
CO
LA1
LA2
LA3
10
14
12

FIG. 1

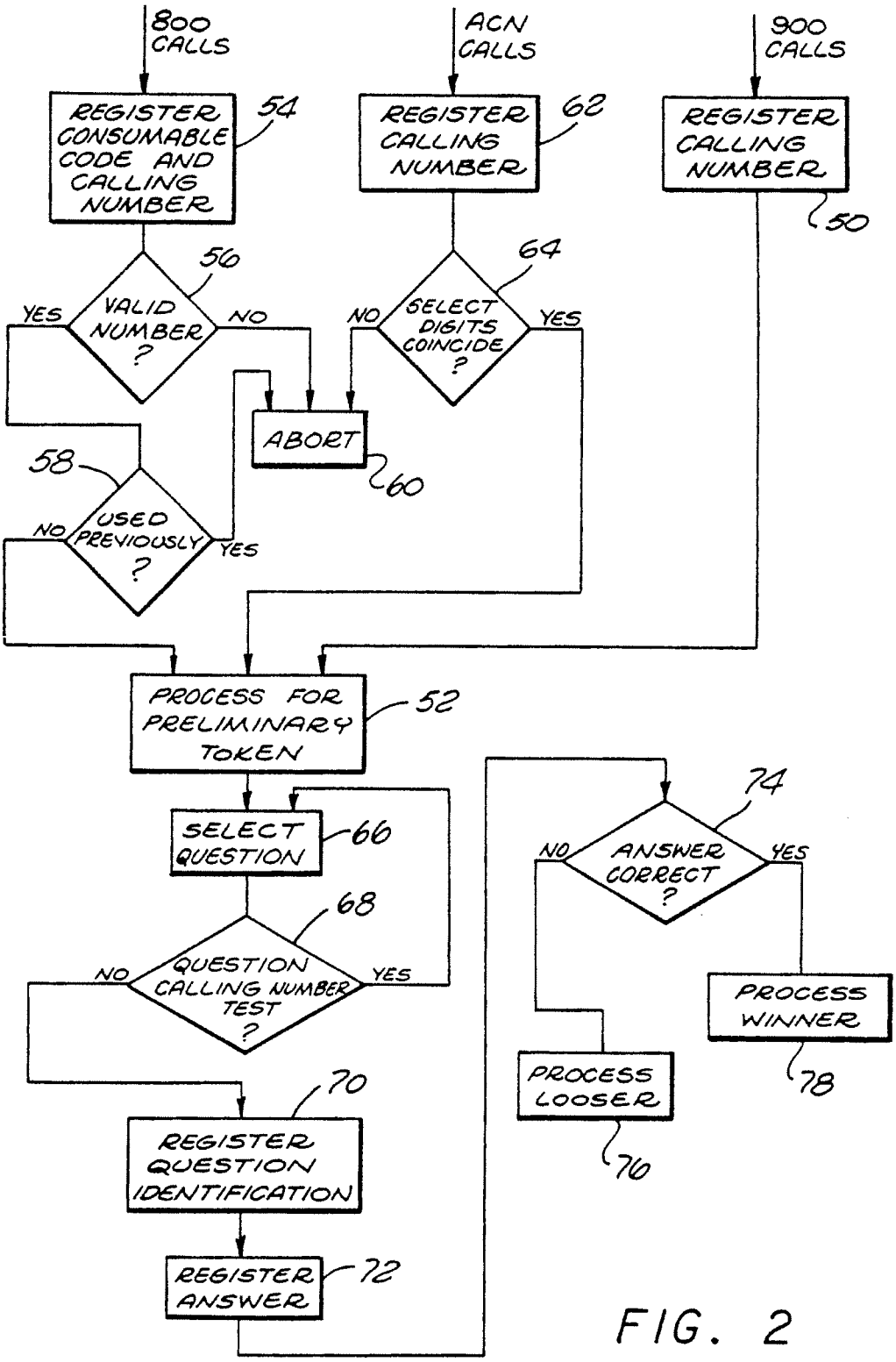

800 CALLS
ACN CALLS
900 CALLS
REGISTER CONSUMABLE CODE AND CALLING NUMBER
54
REGISTER CALLING NUMBER
62
REGISTER CALLING NUMBER
50
56
VALID NUMBER ?
YES
NO
64
SELECT DIGITS COINCIDE ?
NO
YES
ABORT
60
58
USED PREVIOUSLY ?
NO
YES
PROCESS FOR PRELIMINARY TOKEN
52
SELECT QUESTION
66
68
QUESTION CALLING NUMBER TEST ?
NO
YES
70
REGISTER QUESTION IDENTIFICATION
REGISTER ANSWER
72
74
ANSWER CORRECT ?
NO
YES
PROCESS LOOSER
76
PROCESS WINNER
78

FIG. 2

TELEPHONE INTERFACE CALL PROCESSING SYSTEM WITH CALL SELECTIVITY

This is a continuation of application Ser. No. 07/425,779 filed Oct. 23, 1989, now U.S. Pat. No. 5,128,984 which is a continuation-in-part of U.S. patent application Ser. No. 312,792 filed Feb. 21, 1989, U.S. Pat. No. 5,073,929 and entitled "Voice-Data Telephonic control System" which is a continuation-in-part of U.S. patent application Ser. No. 194,258 filed May 16, 1988, and entitled "Telephonic-Interface Statistical Analysis System", now U.S. Pat. No. 4,845,739, which is a continuation-in-part of U.S. patent application Ser. No. 018,244 filed Feb. 24, 1987, and entitled "Statistical Analysis System For Use With Public Communication Facility", now U.S. Pat. No. 4,792,968, which is a continuation-in-part of application Ser. No. 753,299 filed Jul. 10, 1985, and entitled "Statistical Analysis System For Use With Public Communication Facility", now abandoned.

BACKGROUND AND SUMMARY OF THE INVENTION

Recent years have seen a considerable growth in the use of telephonic communications. For example, in various applications, telecommunications applications have expanded to accommodate voice-digital interfaces between computer apparatus and callers at remote telephone terminals. For example, by actuating the push buttons at a remote telephone terminal, a caller controls a computer apparatus to provide various entertainment or information. In using such a system, a caller might telephone a financial service and selectively actuate the telephone key panel to receive information on specific stocks or bonds.

Digital interface systems also have been implemented to utilize digital signals provided independently of the caller's actions. For example, the so-called "ANI" telephone equipment provides digital signals indicating a caller's telephone number. Equipment designated "IDNIS" is similarly available to indicate the called number. Thus, digital signals may be provided telephonically to a system associated with individual calling terminals as for identification or other use.

Telephonic games and contests are among the various applications that have been recognized for implementation with telephone interface systems. Such games and contests may be variously presented, as in cooperation with an advertising program for a product or in a lottery format. Generally with respect to such applications, various call modes might be utilized.

Essentially, three telephonic calling modes or services are in widespread use. Specifically, caller-charge or "900" service (including "976" calls) involves a charge to the caller for each call. The "900", calling mode is useful for implementing games and contests with telephone interface systems; however, certain problems are encountered. Specifically, certain telephone terminals, e.g. pay phones, do not accommodate "900" service. Also, with respect to certain forms of games and contests, it is important to offer members of the public an alternative "free" method of participation. In general, the system of the present invention may be employed to implement "900" calling modes while accommodating "free" participation with reasonable control.

Telephone calls may be accommodated without charge using "800" service or calling mode. Generally, the "800", calling mode accommodates free calls by callers in various areas to a particular station incurring the charges. In most applications, it is important to regulate the use of the "800" calling mode. Another calling mode is the traditional method of calling, involving area-code numbers which also includes calls placed within a given area code which do not usually involve a specific charge and usually do not require dialing the area code. One of the problems associated with using the area-code calling mode for interface systems is the vast number of calls. For example, even in association with an advertising campaign, inviting members of the general public to participate in a free contest or game by telephone may prompt an overwhelming response. Accordingly, a need exists for a practical system to control and limit calls to an interface-service in the traditional free area-code number mode.

Another aspect of telephonic-interface contests involves zealous or obsessive participants. For example, in a quiz contest, a zealous person might call repeatedly, researching answers to given questions until ultimately a question is repeated. At that time, the caller is ready with an answer and has an unfair advantage in the contest. Thus, a need exists for control within the interface system.

In general, the system of the present invention involves a telephone call processing system for receiving calls from a multitude of terminals in different call modes and for processing calls, as to a game or contest format, with means to limit repeat-call advantages. In a disclosed form, the system implements three calling modes to facilitate various formats while accomplishing certain protection both with regard to the calling mode and contest formats.

BRIEF DESCRIPTION OF THE DRAWINGS

In the drawings, which constitute a part of this specification, exemplary embodiments exhibiting various objectives and features hereof are set forth, specifically:

FIG. **1** is a block diagram of a system constructed in accordance with the present invention; and

FIG. **2** is a flow diagram of an operating format of the system of FIG. **1**.

DESCRIPTION OF THE ILLUSTRATIVE EMBODIMENT

As required, a-detailed illustrative embodiment of the present invention is disclosed herein. However, telephone techniques, physical communication systems, data formats and operating structures in accordance with the present invention may be embodied in a wide variety of forms and modes, some of which may be quite different from those of the disclosed embodiment. Consequently, the specific structural and functional details disclosed herein are merely representative, yet in that regard, they are deemed to afford the best embodiment for purposes of disclosure and to provide a basis for the claims herein which define the scope of the present invention.

Referring initially to FIG. **1**, a series of remote terminals TL-TN (telephone instruments) are represented (left). The terminals TL-TN may be functionally similar and accordingly only the terminal T1 is shown in any detail. The indicated terminals TL-TN represent the multitude of telephone terminals existing in association

with a communication facility CO which may comprise a comprehensive public telephone network.

The communication facility CO, accommodating the individual terminals TL-TN, is coupled to a central processing station CS generally indicated within a dashed-line block. In the station CS, to illustrate operating aspects of the present invention, calls are selectively accepted and interfaced so as to accomplish a desired operating format, for example a contest or game.

Generally, calls from the individual terminals TL-TN might be in any of three modes, i.e. the "800" mode, the "900" mode or the area-code mode (traditional area code plus number or local number dialing). In the disclosed illustrative system, depending on individual calling modes, calls are selectively accepted for interface processing. Generally, the interface format accommodates "900" calls with supplemental "800" calls to accommodate both "free" access and all types of telephone terminals. In the disclosed embodiment, calls in the "800" mode are restricted in accordance with prearranged limitations. Furthermore, calls in the area-code mode (from all areas), the 800 mode and 900 mode may be limited to callers having a station number containing a predetermined digit sequence. For example, calls might be restricted to those from terminals having a telephone number ending in the digits "234".

The processing station CS also is controlled to limit the effectiveness of zealous callers. For example, in a contest format, callers may be quizzed with questions randomly drawn from an inventory. In accordance herewith, questions are not repeated to individual telephone terminals T1-TN. Thus, some control is imposed on an aggressive caller who might otherwise be given two opportunities to answer the same question.

Considering the system of FIG. **1** in greater detail, the exemplary telephone terminal T1 includes a handpiece **10** (microphone and earphone) and a panel **12** provided with a rectangular array of individual push buttons **14** in a conventional configuration. Of course, the handpiece **10** accommodates analog signals while the panel **12** is a digital apparatus. During an interface operation, as disclosed in detail below, the caller is queued or prompted vocally through the handpiece **10** (earphone) to provide digital responses using the buttons **14**.

At this stage, some specific aspects of the communication interface are noteworthy. Essentially, as a result of telephonic dialing at one of the terminals TL-TN, the communication facility CO couples the select terminal to an audio response unit. Specifically, to illustrate various aspects, three separate audio response units are provided in the station CS to accept calls in the three distinct modes. That is, an audio response unit **18** receives calls in the "800" mode. An audio response unit **20** receives calls in the area-code dialing mode, and an audio response unit **22** receives calls in the "900" dialing mode.

It will be understood that although three separate audio response units are illustrated, systems incorporating the principles of the present invention may well incorporate various numbers of audio response units for each calling mode, with each audio response unit having the capability to accommodate a substantial number of calls as indicated by the lines from the communication facility CO in FIG. **1**. Alternatively, a single composite unit might be utilized. Also, the mode or aspects of the described embodiment might well be implemented singly or in various combinations. Herein, for purposes of explanation, calls are treated individually and processed accordingly through the three audio response units **18**, **20** and **22**.

Generally, the audio response units **18**, **20** and **22** connect callers at remote terminals TL-TN from the communication facility CO through a coupler **24** (FIG. **1**, station CS, center) to an interface processor **26**. Both the coupler **24** and the processor **26** are connected to a control unit **28** that is also connected to the audio response units **18**, **20** and **22**. Accordingly, with overall supervision by the control unit **28**, the audio response units **18**, **20** and **22** answer and preliminarily qualify callers from the terminals TL-TN for connection through the coupler **24** to the interface processor **26**.

Upon completion of an interface connection in the disclosed embodiment, a contest format is executed by vocally prompting callers to respond with digital data. At this point, it is noteworthy that the communication facility CO also provides identification signals to the audio response units **18**, **20** and **22**. Specifically, digital identification signals representing numbers associated with the calling terminals TL-TN are provided by "ANI" equipment independent of any action by the caller. In the event "ANI" equipment is not available, callers may be vocally prompted to provide the digital representations by selectively depressing the buttons **14**.

The telephone communication facility CO also may provide digital signals indicating the called number. Generally, such a capability involves equipment designated "DNIS". The capability may be useful in various embodiments of the present system, as to distribute calls from a single equipment as mentioned above.

Pursuing the exemplary structure of FIG. **1** in still greater detail, the communication facility CO provides three sets of trunks or lines LA1, LA2 and LA3 respectively coupled to the audio response units **18**, **20** and **22**. From the audio response units **18**, **20** and **22**, sets of lines LB1, LB2 and LB3 are connected to the coupler **24**. Under control of the control unit **28**, the coupler **24** connects individual lines **37** of the sets LB1, LB2 and LB3 to the processor **26** through lines **39**.

Generally, the audio response units **18**, **20** and **22** may take the form of well known telephonic structures with the capability to "answer" calls and interface callers in a preliminary way. Each of the units **18**, **20** and **22** incorporate a voice generator along with some basic programmable logic capability.

The audio response unit **18** is coupled to a free-call memory **32**. Generally, the unit **18** in cooperation with the memory **32** operates with the control unit **28** to qualify acceptable calls in the "800" mode.

The audio response unit **20** is connected to a select-number coincidence detector **34**. These structures along with the control unit **28** test area-code mode calls. The audio response unit **22** accepts calls without initial qualification.

The system of the disclosed embodiment selectively qualifies callers depending on their calling mode. Additionally, the system responds to caller identification to enhance contest equity. Generally, the interface processor **26** poses questions to calling contestants and stores the resulting answers in a result memory **36**. Questions given to contestants are selected from a memory **38** by a random number generator **40**. Essentially, the memory **38** contains an inventory of questions addressable by numbers provided by the random number generator **40**. The address numbers from the generator **40** are also supplied to a coincidence detector **42** that also receives

the address numerals of questions previously presented to a specific caller from a record **44**. Thus, before a question is presented to a caller, the number of the calling terminal is checked to assure that the same question has not previously been posed to a caller at that terminal.

If the coincidence-detector **42** clears the current question as not being repetitive, a gate **46** is qualified and the question is supplied from the memory **30** to the interface processor **26**. A voice generator within the interface processor **26** then provides signals through a designated line **39**, the coupler **24**, a line **37**, one of the audio response units and the communication facility CO to the connected remote terminal. As a result, the caller hears a simulated voice question. The answer is provided by the caller actuating the buttons **14** at the calling terminal. In that regard, the question may be in a multiple choice or true-false format to accommodate simple push button actions at the terminal.

In view of the above description of structural elements in the disclosed embodiment, a comprehensive understanding of the system may now best be accomplished by assuming certain operating conditions and describing the resulting operations. Accordingly, assume that the system CS is programmed to accommodate a relatively simple game format, that is, a sponsored contest for the promotion of a product, e.g. the XYZ Widget. Further assume the contest is of limited participation based either upon: the payment of a token fee ("900" calling mode), prearranged participation ("800" calling mode), lottery selection (area-code calling mode) or lottery selection in combination with either 800 or 900 calling modes. Considering exemplary possibilities of the format, the XYZ Widget might be advertised with an invitation to participate via the "900" calling mode. Alternatively, participants might be variously qualified as by select notification; however, in the exemplary format, such participants would incur a token charge imposed through "900" telephonic service. To consider an example, an offering might be stated: "If your last three phone digits are 972 you may call, 1) if you wish, call 1 900 XXXX972 ($0.95 service charge) provided your last three phone digits are 972; 2) if you have written in for a 'free to enter' you can use the one-time PIN number provided your last three phone digits are 972. In this case you can use the 'free' 800 number provided to you with your PIN number."

As indicated above, some telephone terminals do not accommodate "900" calling mode. Also, under certain circumstances, it is important to afford members of the public "free" access to participate in various games or contests. For example, such participation might be arranged by mail or other communication to provide a participant with a limited-use (i.e. One) qualification number. With use, the numbers are stored in the memory **32** and the list is checked subsequently to avoid repeat use.

A third class of contest participants might be considered lottery winners. For example, the sponsor might televise a drawing of three decimal digits to provide a sequence of three numbers. The three numbers might identify "winning" or "entitled" participants by corresponding to the last three numbers (digits) of their telephone number. For example, the drawing of the numbers "257" would entitle a single call participation from any of the telephone terminals TL-TN designated by a number, the last three digits of which are "257".

In an exemplary contest format, participants might be asked a-few test questions (for minor prizes and the ability to participate in a lottery). of course, a vast-variety of possibilities exist; and in that regard. interim prizes may be awarded to participants as the format proceeds from the initial call to the ultimate prize. At the present point, it is important to appreciate that the system accommodates participants using various telephone call modes with select qualification to participate in an interface format utilizing voice prompt and push-button digital communication. In accordance with the described example, the sponsor invites participants to enter using "900" calling mode service. As a part of such an invitation, persons are advised that "free" entry or participation may be gained by sending a self-addressed envelope to receive an entry number, e.g. eight digits, for use via "800" calling mode service. In the disclosed embodiment, the eight-digit numeral is coded for verification. Of course, numerous possibilities exist. As a simple example the second and sixth digits of the number might have a specific sum, e.g. seven or seventeen. That is, the second and sixth digits might be: three and four, five and two, six and one, seven and zero, nine and eight and so on. A qualifying number would be: "34726313", the second and sixth digits being four and three, respectively.

With the arrangements completed for calling entries in the "900" and "800" mode, the contest might operate for several days before being opened to area-calling participants. That is, the area-calling mode might be available only after a televised drawing entitling participation from a select group of telephone numbers for a limited period of time.

In view of the above assumptions and descriptions, consider now the operation of the system as depicted in FIG. **1** in relation to the process diagram of FIG. **2**. That is, assume the system of FIG. **1** is implemented and programmed to accommodate the exemplary operations as will now be described with reference to the process diagram of FIG. **2**.

First, suppose a caller at the terminal **T1** places a call in the "900" mode in response to an advertisement by a sponsor promoting XYZ Widgets. Perhaps the caller will receive at least a token gift and might qualify for a major lottery prize.

The assumed call involves the caller actuating the buttons **14** as for example to input: "1 900 5558945". As a result, signals are provided to the communication facility co resulting in a connection from the remote terminal **T1** to the audio response unit **22**. With the connection, the communication system co also provides the audio response unit **22** with digital identification signals representative of the designation for remote terminal **T1** ("212 627 2222"). The identification signals are provided by the ANI equipment within the communication facility CO and are registered by the audio response unit **22**. The operation is illustrated as a process step in FIG. **2** by the block **50** (upper right) for "900" mode calls.

As suggested above, it may be desirable for a format to provide a token award to all callers in the "900" mode. Recognizing such particulars as possibilities, in the disclosed embodiment. calls in the "900" mode are passed through the audio response unit **22** (FIG. **1**) and the coupler **24** to the interface processor **26**. Accordingly, the interface processor **26** receives the calling number and processes the contest format as described in detail below.

The initial step of the format common to all call modes is represented by the block **52** in FIG. **2**. However, as calls in all modes are processed similarly from that point, before proceeding with the explanation, the preliminary operations attendant other calling modes first will be explained.

As explained above, certain accommodations are made for participation in the "800" (caller free) mode. Accordingly, assume a caller at the terminal **T1** has been given an identification number: "34726313" for use in the "800" mode. Accordingly, the caller dials a number, e.g. "800 555 3478", actuating the terminal Ti and the communication facility Co to provide a connection with the audio response unit **18**. With communication, the audio response unit actuates an internal voice generator prompting the caller to key in his assigned number, "34726313". As the digits of the number are keyed in by the caller, they are supplied from the audio response unit **18** to the control unit **28** and the free-call memory **32**.

Within the control unit **28**, logic is provided for verifying the identification number as proper. In accordance with the simple example explained above, the control unit **28** would simply sum the second and sixth digits to test for a total of "7". The coincidence test is represented by the query block **56** in FIG. **2**. As indicated above, various codes and verification techniques are well known along with the apparatus for verifying assigned numbers.

If the control-unit **28** validates the qualification number "34726313", it is recorded in the free-call memory **32** for future checking against repeat use. Accordingly, each call in the "800" mode also involves a check or test from the audio response unit **18** to the memory **32** to determine whether or not the assigned qualification number has been previously used. The previous-use test is illustrated as a process step by the query block **58** in FIG. **2**.

If the control unit **28** determines the qualification number to be invalid or the memory **32** reveals the number has been previously used,- the communication is aborted by the audio response unit **18**. For example, the audio response Unit **18** may be actuated to provide simulated audio signals carrying a message terminating the communication. For example, the caller might be advised: "The number you have provided is not valid. Consequently, your participation cannot be accepted on that basis."

If the entered number is valid and has not been previously used, the tests indicated by the query blocks **56** and **58** (FIG. **2**) are positive and the process again proceeds to the common step as indicated by the block **52**, e.g. as to receive a token gift.

As indicated above, a third possibility for contest participation involves calling in the area-code mode. While numerous format possibilities exist, as suggested above, access for callers in the area-code mode might be limited to a relatively short period of time. For example, a television program advertising the XYZ Widget might include a drawing to select the telephone terminals from which callers may participate for a period of twenty-four hours. As indicated above, the drawing might identify the last three digits of telephone numbers for the approved terminals.

Following a relatively short time (e.g. One day) during which area-code callers may enter the contest, the contest might be concluded with the ultimate winner or winners determined. In any event, assume the presence of a caller at the terminal T2 with an approved telephone number, i.e. "212 627 2257". Somewhat as explained above with respect to other calling modes, keying operations by the caller at the remote terminal T2 result in a connection through the communication system CO to the audio response unit **20**. As previously, the communication facility CO provides digital signals to the audio response unit **20** indicating the calling number (ANI). Thus, the calling number is registered as indicated by the block **62** in FIG. **2**. As previously, in the event ANI equipment is not operative to serve the remote terminal T2, then the caller may be asked to key in his telephone number for subsequent verification.

From the audio response unit **20**, the caller's number is supplied to the coincidence detector and storage unit **34** for a two-stage test. A first test simply seeks a coincidence between the approved number sequence (three digits) and the last three digits of the calling number. In the example, the last three digits of the calling number ("257") are compared with the select digit sequence, "257". The test is indicated by the query block **64** in FIG. **2**.

As a secondary test, the unit **34** may check a record of previous use. Thus, the unit **34** simply implements test logic to-accomplish these comparison-step operations with structures as well known in the prior art.

If the tests are negative, as indicated by the query block **64**, the communication is aborted as indicated by the block **60**. Alternatively, a favorable test again directs the system to proceed to the step of block **52** at which the process enters a common phase for all calling modes.

With the entry of a call into the common phase, the line carrying the call is connected through the coupler **24** (FIG. **1**) to the interface processor **26**. That is, depending on the call mode, the call is passed through one of the audio response units **18**, **20** or **22** and the coupler **24** to the interface processor **26**. Note that as indicated above, each of the audio response units **18**, **20** and **22** is capable of accommodating a large number of asynchronous calls. Similarly, the coupler **24** is capable of connecting lines from the audio response units **18**, **20** and **22** (LB1, LB2 and LB3 respectively) to the interface processor on an individual basis through lines **37** and **39**.

The interface processor **26** may comprise a relatively substantial computing capability for processing many individual calls with programmed variations. The processing operation is illustrated in FIG. **2** beginning with the block **52**. However, note that as the interface processor **26** receives the telephone number identifying a calling terminal (ANI) reference may be made to a data bank. Therefore, the operation might involve reference to substantial data on a caller. Accordingly, a basis exists for several process variations accommodated by data from a bank. The block **52** represents such possibilities as well as-further informing or processing callers.

With the receipt of a call at the interface processor **26**, a voice generator may be actuated to specifically inform a caller, depending upon the specific format employed. Essentially, digital signals are provided to actuate a voice generator within the processor **26**. Accordingly, an audio message is provided through the coupler **24**, the associated audio response unit, and the communication facility CO to the connected remote terminal. Thus, the caller may be further informed or cued.

In the disclosed embodiment, concurrently with the operation of further informing the caller, the interface

processor **26** actuates the random number generator **40** to provide a random address for the question memory **38**. The process step is illustrated in FIG. **2** by the block **66**.

The random number (identifying a question in the memory **38**) is also provided to the coincidence detector **42** to test for the previous use of the question to the calling terminal. In that regard, the interface processor **26** provides the caller telephone number (ANI) to the caller record **44** which may simply take the form of a look-up table addressed by calling numbers and revealing the identification of previous questions propounded. The addresses of questions previously recorded for a calling number are supplied to the coincidence detector **42** for comparison with the current tentative question identification number. The process step is illustrated by the query block **68** in FIG. **2**.

If the tentative question has been previously used for the calling terminal, a signal is provided from the coincidence detector **42** to the interface processor prompting a repeat operation by the random number generator **40** to select another question.

Alternatively, if the tentative question is not a repeat, then the coincidence detector **42** qualifies the gate **46** and the tentative question is supplied to the interface processor **26** for actual use. Note that upon the occurrence of an approved question, the coincidence detector also supplies a signal to the call record **44** which records the identification number of the question. The process step is illustrated in FIG. **2** by the block **70**.

With the provision of signals representing a question through the gate **46** to the interface processor **26**, the internal voice generator is actuated to propound the question to the caller. Recognizing the vast possibilities for contest formats, one or more rather difficult questions might be prepounded to isolate lottery participants. Alternatively, a relatively easy question may be propounded as a minor obstacle to participation in the final phase of the contest. In any event, as prompted or cued, the caller responds using the buttons **14** and the response is registered for testing within the interface processor **26**. The process steps are indicated by the block **72** and the query block **74** in FIG. **2**. The results of the tests are then stored in the interface result memory **36**. Note that in the interests of human perception, a printed record may be developed concurrently with the qualification of lottery participants.

Final processing to determine a winner or winners may involve any of various operations as a drawing, an event, and so on. Accordingly, as indicated by the blocks **76** and **78**, final determinations are made of winners and losers with predetermined prize allocations. Thus, the system of the present invention enables effective regulation and control of interfaces between persons at telephone stations and a central processing apparatus. Calls in various modes are accommodated with appropriate tests, and interface data (e.g. test questions) are qualified.

In view of the above descriptions, it will be apparent that the disclosed embodiment is susceptible to considerable modification in the implementation of the present invention in conjunction with a telephone system to accommodate caller interface operations. Although the disclosed embodiment is directed to a contest, it will be apparent that aspects of the system may be variously embodied to accommodate any of a variety of telephone interface operations. Furthermore, it will be apparent that while the disclosed embodiment comprises specific elements and configurations, any of a variety of structures might well be utilized. Accordingly, the scope hereof is deemed to be as set forth in the claims below.

What is claimed is:

1. A telephone interface system for individually interfacing callers at a multitude of remote terminals for voice-digital communication through a telephone communication facility, said system comprising:

communication means for establishing telephone communication with currently active callers at certain of said terminals through said telephone communication facility;

means for providing identification signals to said communication means indicative of said currently active callers;

memory means for storing caller cues and use indications for said caller cues in relation to said callers as identified by said identification signals;

cue means for receiving said caller cues to provide voice signals through said communication means to prompt responses from said currently active callers in the form of digital data signals; and

means for selecting a caller cue for said currently active caller from said memory means for application to said cue means under control of said identification signals and said use indications in said memory means for said one of said currently active callers whereby to limit caller cues provided to individual callers for avoiding duplication.

2. A system according to claim **1** further including means to process said digital data signals.

3. A telephone call processing system for receiving calls from a multitude of terminals for processing in a lottery interface format wherein callers are cued by synthesized voice signals supplied to said terminals and respond with digital signals, as by actuating push buttons at said terminals, said system comprising:

means for selectively receiving calls from said multitude of terminals to establish telephone communication with a select subset of callers;

means for generating identification signals for specifically identifying each of said callers of said select subset;

means for individually cuing said callers of said select subset to prompt digital signals for processing to isolate a sub-subset of said callers; and

means for storing said identification signals for said callers of said sub-subset.

4. A telephone call processing system for receiving calls from a multitude of terminals in different call modes including an "800" call mode and a "900" call mode for processing to an interface format and involving digital signals provided by said terminals as for identification or data, said system comprising:

first response unit means for receiving calls in said "800" call mode;

qualification means for qualifying said calls in said "800" call mode received by said first response unit to provide qualified calls, said qualification means comprising means for testing said digital signals originating said calls in said "800" call mode, said qualification means also including a limited-use pin number to facilitate participation by mail, said limited-use pin number including data consisting of said tested digital signals;

second response unit means for receiving calls in a second call mode;

means for processing calls in an interface format; and

means for coupling said qualified calls and said calls in a second mode to said means for processing.

5. A system according to claim **4** wherein said limited-use pin number allows at least a single consumable use and includes a check digit to be tested for further qualification.

6. A system according to claim **4** wherein a memory stores digital answer signals provided by a caller in response to questions posed by an interface processor.

7. A system according to claim **6** wherein identification data provided by said caller is stored in said memory, said digital answer signals being stored when said answer signals are correct.

8. A system according to claim **7** wherein said caller identification data includes caller telephone number data.

9. A telephone call processing system for receiving calls from a multitude of terminals for processing to an interface format and involving digital signals associated with said terminals as for identification or data, said system comprising:

cue means for prompting question responses from said terminals in the form of digital signals as data;

question selection means for selecting individual questions from a plurality of questions for actuating said cue means,

call record memory means for storing identified questions cued to said terminals, addressable by said digital signals associated with said terminals for identification;

test means for testing individual questions selected by said question selection means against questions from said call record memory means to detect coincidence; and

means for receiving automatic number identification (ANI) data, said data for testing individual questions selected by said question selection means against questions from said call record memory means to detect coincidence;

control means coupled to said cue means, said selection means, said memory means and said test means, said control means for sequencing operations to select a question, test the selected question and either actuate said cue means or select another question under control of said test, said control means also including a gate structure for inhibiting the cue means in the event of selecting a question of record in said call record memory means.

10. A telephone call processing system as defined in claim **9**, further comprising:

"900" call response means for receiving calls in a "900" call mode.

11. A telephone call processing system as defined in claim **9**, further comprising:

"800" call response means for receiving calls in an "800" call mode; and

qualification means for qualifying calls in said "800" mode to provide qualified calls.

12. A telephone call processing system as defined in claim **11**, wherein said qualification means test select digits of said digital signals associated with said calling terminals.

13. A telephone call processing system for receiving calls from a multitude of terminals for processing in a contest interface format wherein callers are cued by synthesized voice signals supplied to said terminals and respond with digital signals, as by actuating push buttons at said terminals, said system comprising:

means for receiving calls from said multitude of terminals and establishing telephone communication to select a subset of callers based upon online responses provided by said select subset of callers to contest questions, said means for receiving calls comprising means for receiving calls in a plurality of call modes including an "800" calling mode;

means for providing identification signals for said callers of said select subset; and

means for processing data relating to said callers of said select subset to isolate a sub-subset of said callers.

14. A telephone call processing system according to claim **13** wherein a random number generator is sued to isolate said select sub-subset.

15. A telephone call processing system according to claim **13** wherein at least the "800" callers are limited to a one time use.

16. A process for receiving calls from a multitude of terminals in different call modes including an "800" call mode and a "900" call mode and processing to an interface format, wherein the process involves digital signals provided by said terminals as for identification or data, comprising the steps of:

receiving calls in said "800" call mode;

providing a limited-use pin number to facilitate free participation via said "800" call mode;

qualifying said calls in said "800" call mode based on said limited-use pin number to provide qualified calls;

receiving calls in said "900" call mode; and

coupling said qualified calls and said calls in said "900" mode for processing to said interface format.

17. A process for receiving calls according to claim **16** wherein at least the "800" callers are limited to a one time use.

18. A process for receiving calls according to claim **16** wherein said limited-use qualification number is coded for verification.

* * * * *

EXHIBIT 5

US005351285A

United States Patent [19]

Katz

[11] Patent Number: 5,351,285

[45] Date of Patent: Sep. 27, 1994

[54] **MULTIPLE FORMAT TELEPHONIC INTERFACE CONTROL SYSTEM**

[75] Inventor: **Ronald A. Katz**, Los Angeles, Calif.

[73] Assignee: **First Data Resources Inc.**, Omaha, Nebr.

[21] Appl. No.: **47,241**

[22] Filed: **Apr. 13, 1993**

Related U.S. Application Data

[63] Continuation of Ser. No. 509,691, Apr. 16, 1990, abandoned, and a continuation-in-part of Ser. No. 640,337, Jan. 11, 1991, which is a continuation of Ser. No. 335,923, Apr. 10, 1989, which is a continuation of Ser. No. 194,258, May 16, 1988, Pat. No. 4,845,739, which is a continuation-in-part of Ser. No. 18,244, Feb. 24, 1987, Pat. No. 4,792,968, which is a continuation-in-part of Ser. No. 753,299, Jul. 10, 1985, abandoned, said Ser. No. 509,691, is a continuation-in-part of Ser. No. 260,104, Oct. 20, 1988, Pat. No. 4,930,150, which is a continuation-in-part of Ser. No. 18,244, Feb. 24, 1987, Pat. No. 4,792,968, which is a continuation-in-part of Ser. No. 753,299, Jul. 10, 1985, abandoned.

[51] **Int. Cl.**[5] **H04M 11/00**

[52] **U.S. Cl.** **379/94**; 379/95; 379/97; 379/88; 379/142

[58] **Field of Search** 379/94, 97, 96, 98, 379/93, 142, 95, 88, 91, 92

[56] **References Cited**

U.S. PATENT DOCUMENTS

4,320,256	3/1982	Freeman .	
4,757,267	7/1988	Riskin	379/97
4,785,408	11/1988	Britton et al.	379/97
4,797,911	1/1989	Szlam et al. .	
4,812,843	3/1989	Champion et al. .	
5,001,710	3/1991	Gawrys et al.	379/94
5,017,917	5/1991	Fisher et al.	379/95
5,097,528	3/1992	Gursahaney et al.	379/142

FOREIGN PATENT DOCUMENTS

0342295 11/1989 European Pat. Off. H04M 11/00

OTHER PUBLICATIONS

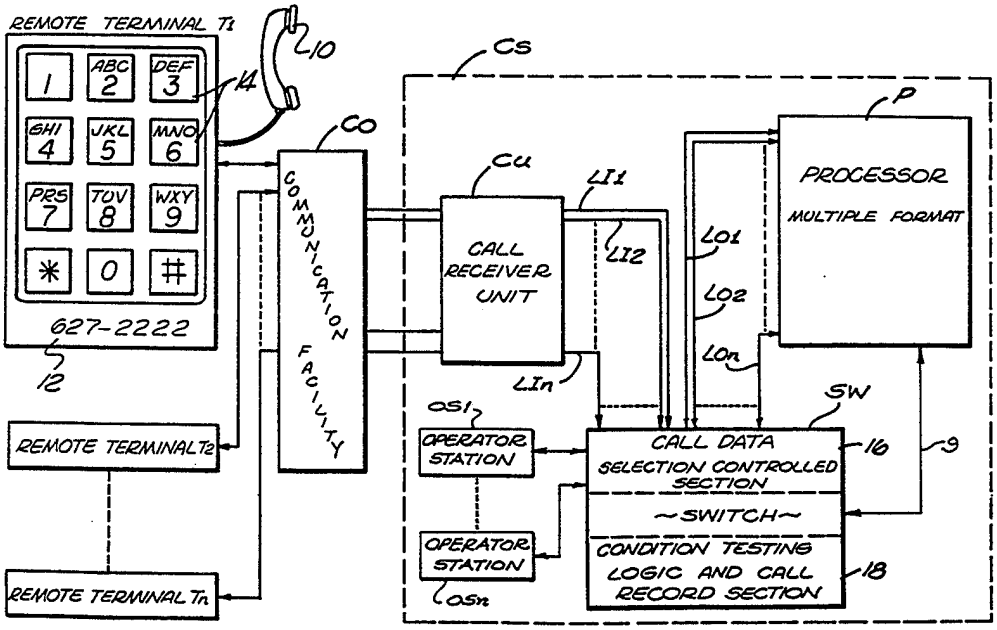
Conversant 1 Voice System: Architecture and Applications, by Robert J. Perdue and Eugene L. Rissanen, ATT Technical Journal, Sep./Oct., 1986, vol. 65, No. 5. The AT&T Multi-Mode Voice Systems-Full Spectrum Solutions for Speech Processing Applications, by S. D. Hester, et al., from the Proceedings of the 1985 AVIOS Conference, Sep., 1985.

Primary Examiner—Curtis Kuntz
Assistant Examiner—Stella L. Woo

[57] **ABSTRACT**

Call data signals actuated by a telephone terminal are provided from a telephone communication system to indicate call data as the called number, the calling number and the calling equipment. The call data signals address related control functions for selectively interfacing a live operator terminal or a multiple format multiple port data processing system. The interface connection involves providing a specific format as for automated processing or to prompt an operator. Screening tests and format selection are performed to make a determination. Individual telephone terminals and individual data formats are arranged and interfaced under controlled conditions specified by the call data. Time tests, history tests and demographic tests may be executed in addition to basic selection and qualification tests. Control may be executed from active data storage for assembled control words and record words. Record words for individual calls may be stored along with developed data.

67 Claims, 5 Drawing Sheets



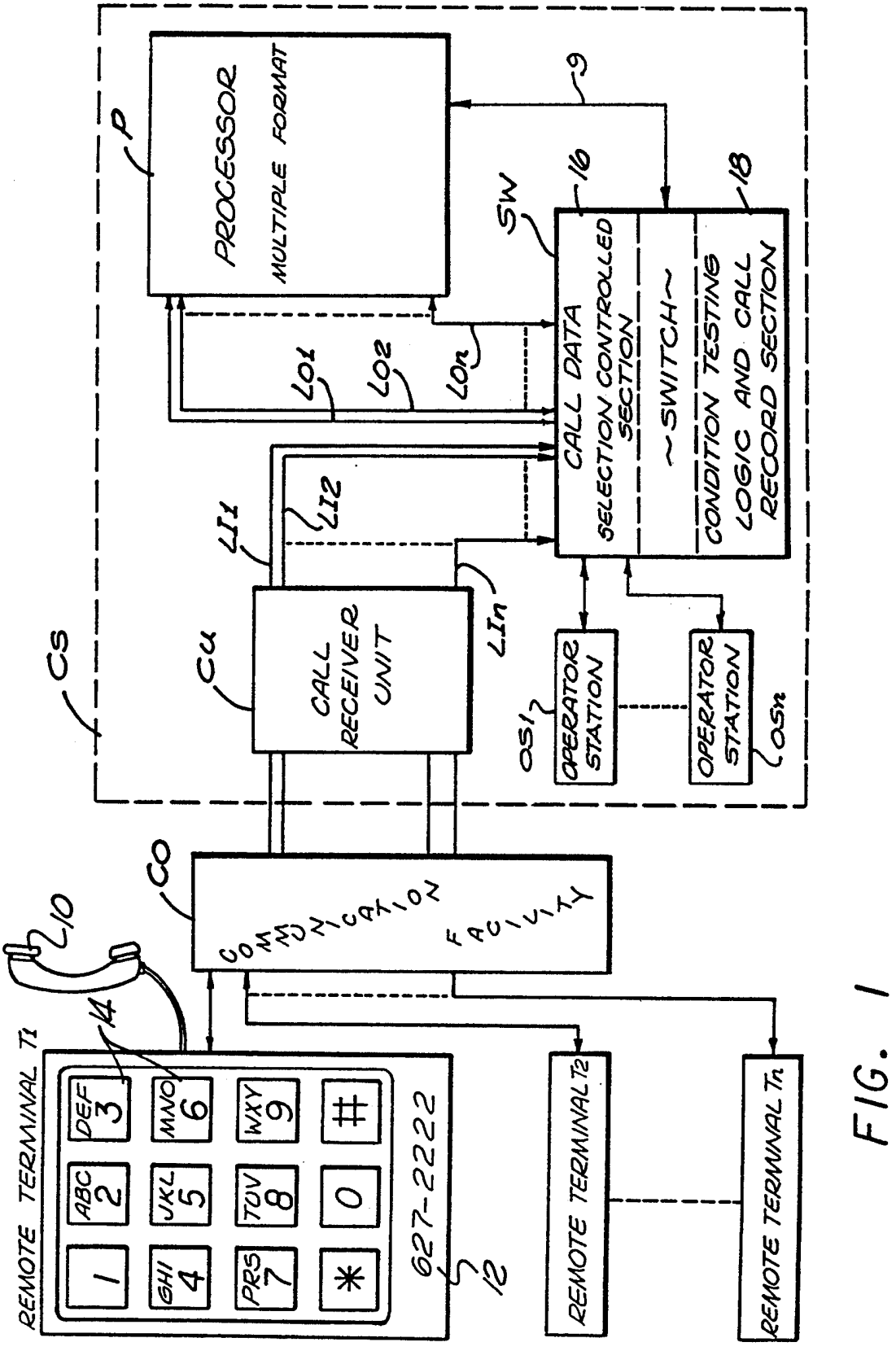
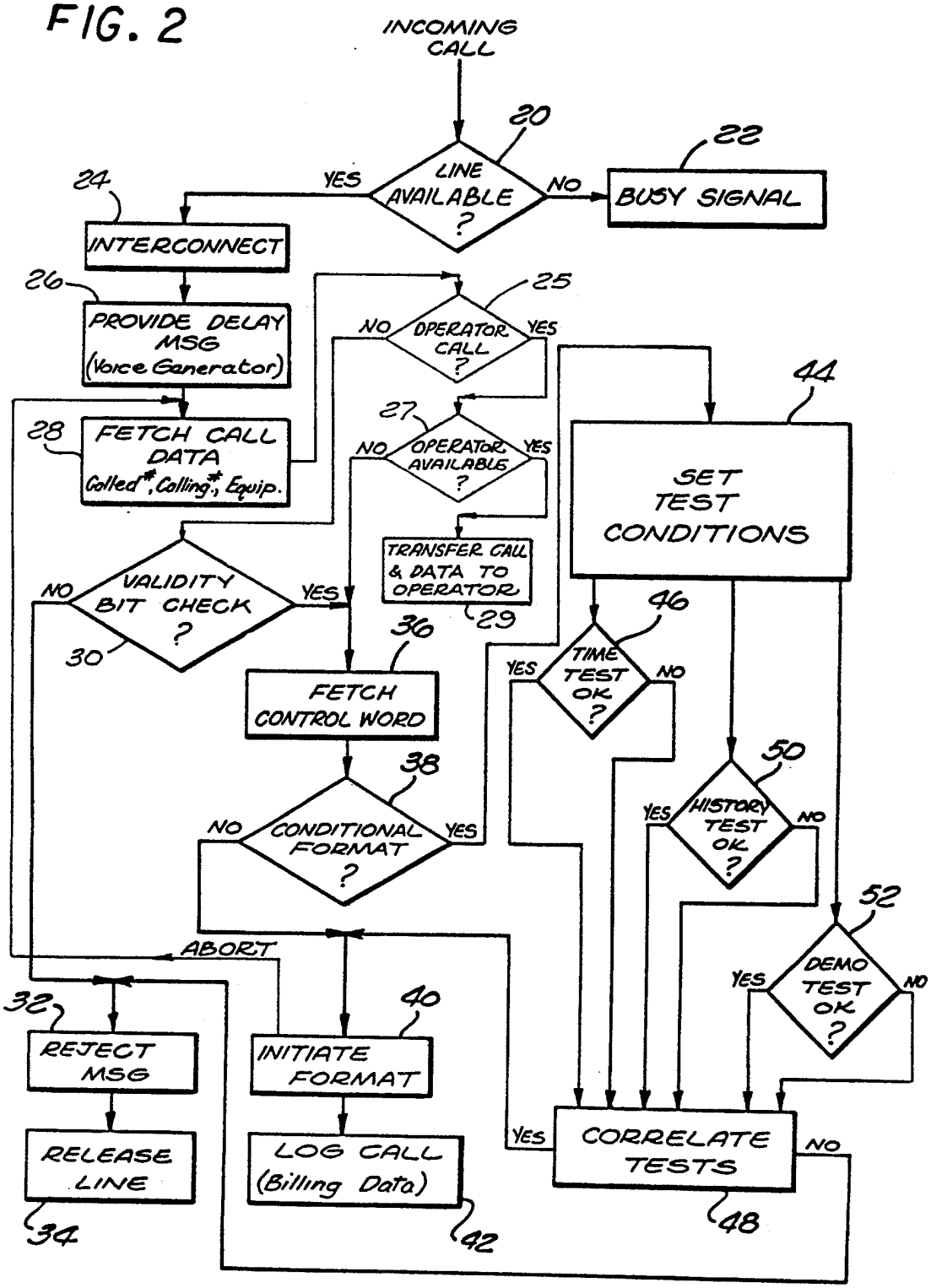

PROCESSOR
MULTIPLE FORMAT
P
9
SW
16
18
CALL DATA
SELECTION CONTROLLED
SECTION
~SWITCH~
CONDITION TESTING
LOGIC AND CALL
RECORD SECTION
Lo1
Lo2
Lon
LI1
LI2
LIn
Cs
Cu
CALL
RECEIVER
UNIT
OS1
OPERATOR
STATION
OPERATOR
STATION
OSn
Co
COMMUNICATION
FACILITY
10
14
REMOTE TERMINAL T1
1
ABC 2
DEF 3
GHI 4
JKL 5
MNO 6
PRS 7
TUV 8
WXY 9
*
0
#
627-2222
12
REMOTE TERMINAL T2
REMOTE TERMINAL Tn

FIG. 1

FIG. 2


INCOMING CALL
20
LINE AVAILABLE ?
YES
NO
22
BUSY SIGNAL
24
INTERCONNECT
26
PROVIDE DELAY MSG (Voice Generator)
25
OPERATOR CALL ?
NO
YES
27
OPERATOR AVAILABLE ?
NO
YES
28
FETCH CALL DATA Called*, Calling*, Equip.
TRANSFER CALL & DATA TO OPERATOR
29
VALIDITY BIT CHECK ?
NO
YES
30
36
FETCH CONTROL WORD
38
CONDITIONAL FORMAT ?
NO
YES
ABORT
32
REJECT MSG
RELEASE LINE
34
40
INITIATE FORMAT
LOG CALL (Billing Data)
42
44
SET TEST CONDITIONS
46
TIME TEST OK ?
YES
NO
50
HISTORY TEST OK ?
YES
NO
52
DEMO TEST OK ?
YES
NO
CORRELATE TESTS
48
YES
NO

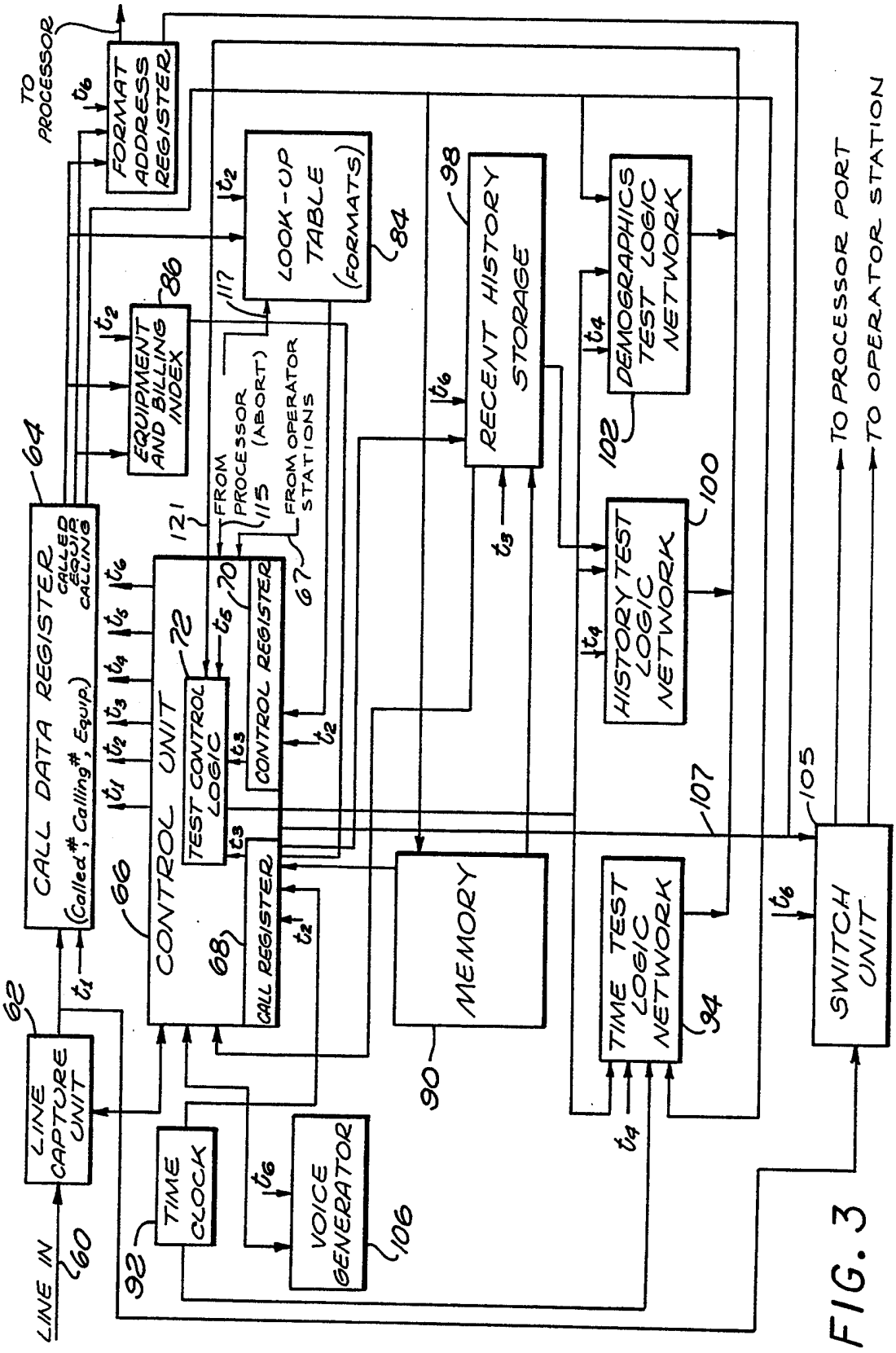

TO PROCESSOR
FORMAT ADDRESS REGISTER
LOOK-UP TABLE (FORMATS)
84
EQUIPMENT AND BILLING INDEX
86
FROM PROCESSOR 115 (ABORT)
FROM OPERATOR STATIONS
117
121
CALL DATA REGISTER
(Called #, Calling #, Equip.)
CALLED EQUIP
CALLING
64
CONTROL UNIT
66
TEST CONTROL LOGIC
72
CONTROL REGISTER
70
67
CALL REGISTER
68
RECENT HISTORY STORAGE
98
DEMOGRAPHICS TEST LOGIC NETWORK
102
HISTORY TEST LOGIC NETWORK
100
MEMORY
90
TIME TEST LOGIC NETWORK
94
SWITCH UNIT
105
107
TO PROCESSOR PORT
TO OPERATOR STATION
LINE IN
60
LINE CAPTURE UNIT
62
TIME CLOCK
92
VOICE GENERATOR
106
t1
t2
t3
t4
t5
t6

FIG. 3

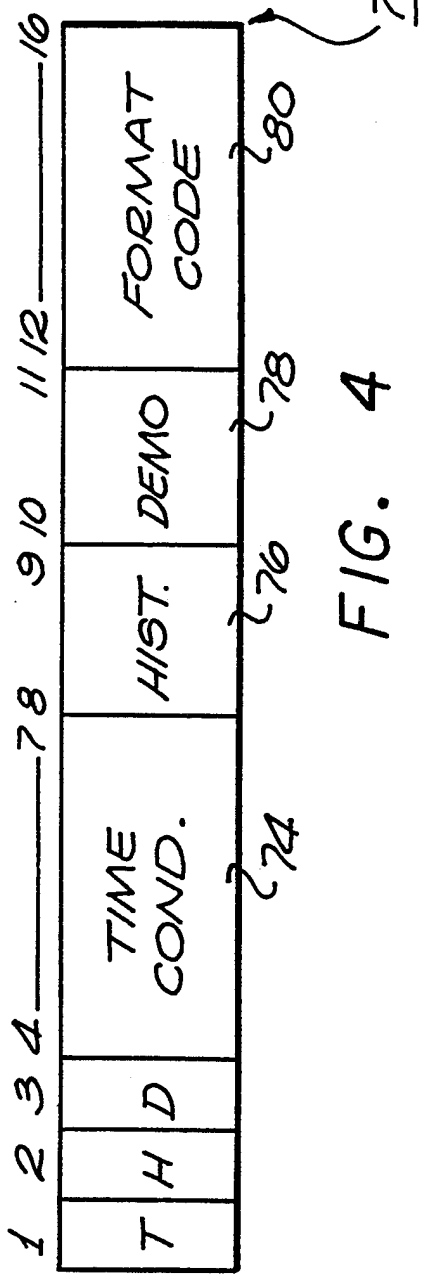

1
2
3
4
7
8
9
10
11
12
16
T
H
D
TIME COND.
HIST.
DEMO
FORMAT CODE
74
76
78
80
70

FIG. 4

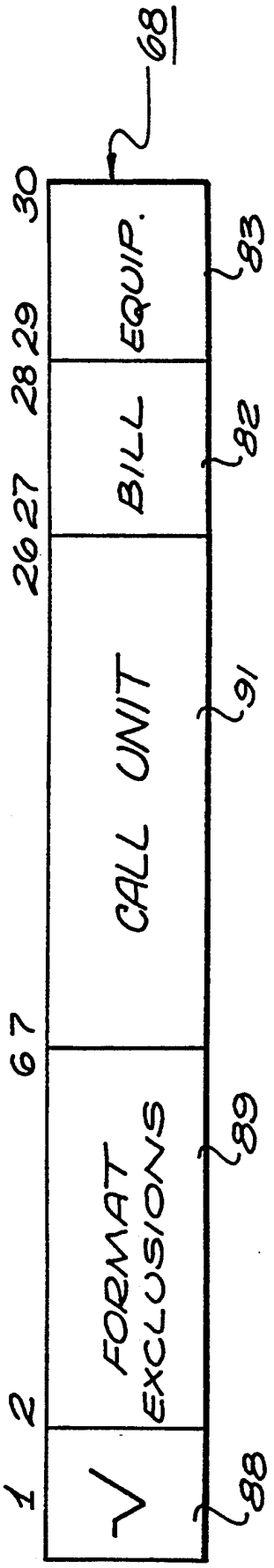

1
2
6
7
26
27
28
29
30
V
FORMAT EXCLUSIONS
CALL UNIT
BILL
EQUIP.
88
89
91
82
83
68

FIG. 5

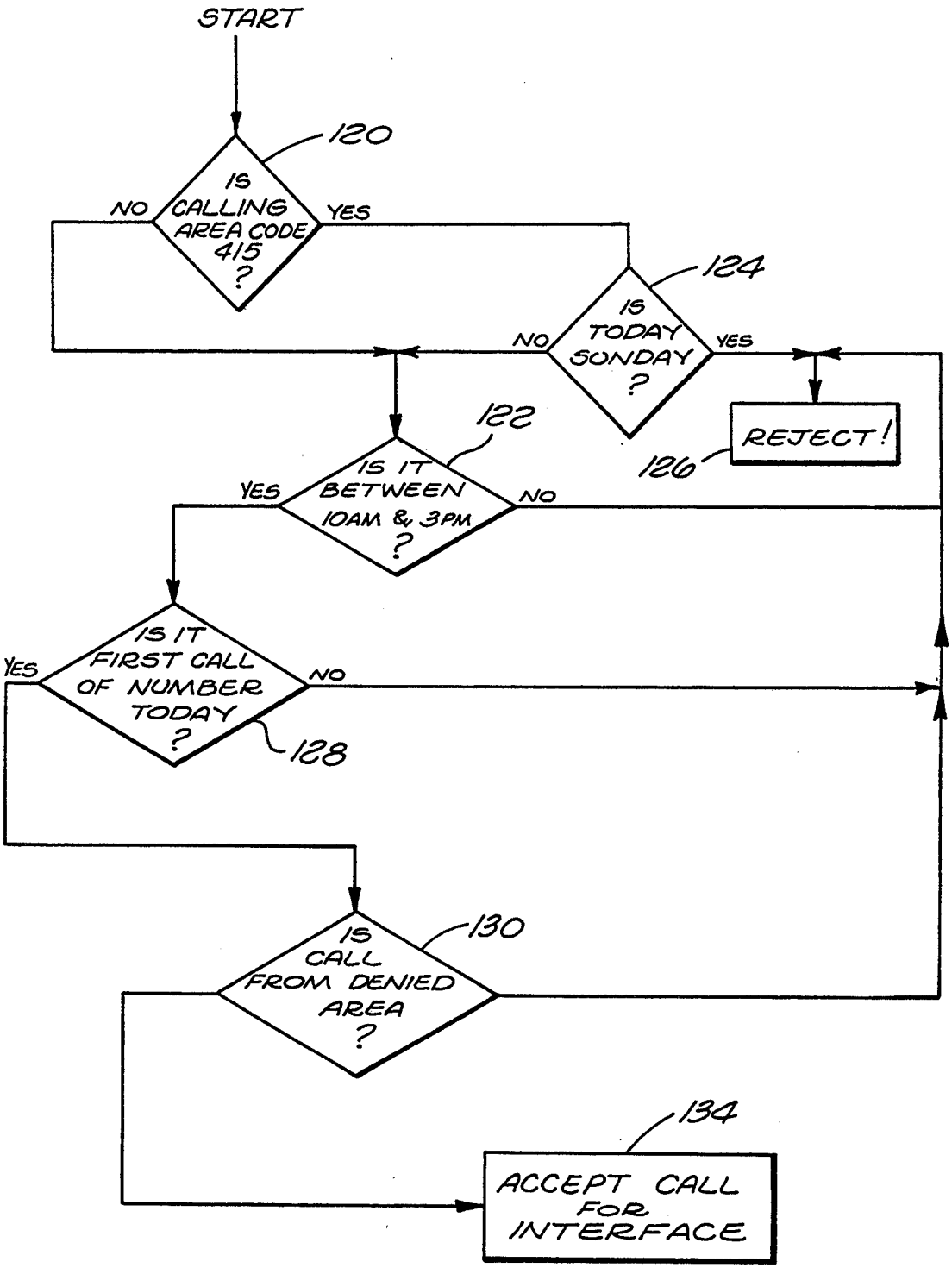

START
120
IS CALLING AREA CODE 415 ?
NO
YES
124
IS TODAY SONDAY ?
NO
YES
REJECT!
126
122
IS IT BETWEEN 10AM & 3PM ?
YES
NO
IS IT FIRST CALL OF NUMBER TODAY ?
YES
NO
128
130
IS CALL FROM DENIED AREA ?
134
ACCEPT CALL FOR INTERFACE

FIG. 6

MULTIPLE FORMAT TELEPHONIC INTERFACE CONTROL SYSTEM

RELATED SUBJECT MATTER

This is a continuation of application Ser. No. 07/509,691 filed Apr. 16, 1990 and entitled "Telephone Interface Control System", now abandoned, which is a continuation-in-part of application Ser. No. 260,104 filed Oct. 20, 1988 and entitled "Telephonic Interface Control System", now U.S. Pat. No. 4,930,150 which is a continuation-in-part of application Ser. No. 018,244 filed Feb. 24, 1987 and entitled "Statistical Analysis System For Use With Public Communication Facility", now U.S. Pat. No. 4,792,968, which was a continuation-in-part of application Ser. No. 753,299 filed Jul. 10, 1985 and entitled "Statistical Analysis System For Use With Public Communication Facility", now abandoned. Also, this application is a continuation-in-part of application Ser. No. 07/640,337 filed Jan. 11, 1991, and entitled "Telephonic-Interface Statistical Analysis System", which is a continuation of application Ser. No. 07/335,923 filed Apr. 10, 1989, and entitled "Telephonic-Interface Statistical Analysis System", which is a continuation of application Ser. No. 07/194,258 filed May 16, 1988, and entitled "Telephonic-Interface Statistical Analysis System", now U.S. Pat. No. 4,845,739, which is a continuation-in-part of application Ser. No. 018,244 filed Feb. 24, 1987 and entitled "Statistical Analysis System For Use With Public Communication Facility", now U.S. Pat. No. 4,792,968, which is a continuation-in-part of application Ser. No. 753,299 filed Jul. 10, 1985, and entitled "Statistical Analysis System For Use With Public Communication Facility", now abandoned. The benefit of the earlier filing dates in the United States is claimed under 35 U.S.C. §120.

BACKGROUND AND SUMMARY OF THE INVENTION

Over the past several years, substantial expansion has occurred in the technology of combining telephonic and computer systems. For example, telephone systems have been developed to readily transmit digital data. Various forms of modems are in widespread use to intercouple telephones and computers. However, at a more personal level, it also has been proposed to utilize the traditional dialing buttons of telephone instruments to provide digital data, as for various processing. In accordance with such arrangements, voice messages prompt callers to provide data by actuating the alphanumeric buttons of conventional telephones. These systems have been proposed in association with computers to provide various services and one such system is disclosed in U.S. Pat. No. 4,792,968, issued Dec. 20, 1988, to Ronald A. Katz from an application Ser. No. 018,244 filed Feb. 24, 1987.

With respect to telephonic-computer systems, attaining the interface format desired by an individual caller is sometimes complex and burdensome. Specifically, callers may be misdirected, screening may be ineffective and delays may be cumbersome. Also, records may be poor or non-existent. Furthermore, some situations exist where interface to a live operator is an important alternative. As a consequence, a need exists for an improved interface system for selectively interfacing a considerable number of individual callers with a multiple format processor, as to attain efficient and economical digital

and vocal exchanges along with prompting and data accumulation.

In general, the present invention comprises a telephonic-computer interface system accommodating digital and vocal (analog) telephonic communication and capable of handling a large number of calls to selectively interface prompted live-operator stations or formats in a computer processor. The selected interface is controlled, as by call (called number, calling number, etc.) and can be altered under control of an operator, developed data or operating conditions. Accordingly, the system of the present invention interfaces: (1) a telephonic communication facility including remote terminals for individual callers, e.g. conventional telephone instruments including voice communication means, and digital input means in the form of alphanumeric buttons for providing data and (2) either a prompted live-operator station or a multiple port, multiple format data processor for concurrently processing data from a substantial number of callers with respect to any of several formats.

The interface system incorporates a controller for receiving calls from remote terminals for association with ports in the telephonic computer apparatus, and which receives signal-represented call data (representing "calling" and "called" telephone numbers) along with equipment information. An index apparatus is controlled, as by the signal-represented call data, to select initially a live-operator or machine format of the processor so as to specify any conditions for the interface, at least one of the formats including at least one condition. A test apparatus may determine whether or not an individual call attains specified conditions and thereby controls switching structure for providing the actual interface. If a live-operator terminal is selected, or indicated as a secondary format, prompt data is provided to a select station. Data is recorded and processing procedures also may be controlled by call data.

BRIEF DESCRIPTION OF THE DRAWINGS

In the drawings, which constitute a part of this specification, an exemplary embodiment exhibiting various objectives and features hereof is set forth, specifically:

FIG. **1** is a block diagram of a system constructed in accordance with the present invention;

FIG. **2** is a flow diagram illustrating the operating process of the system of FIG. **1**;

FIG. **3** is a block diagram of a component portion of the system of FIG. **1**;

FIG. **4** is a diagrammatic representation of a binary control word as registered and utilized in the system of FIG. **1**;

FIG. **5** is a diagrammatic representation of a binary data record word as utilized and recorded in the system of FIG. **1**; and

FIG. **6** is a flow diagram illustrating the operating process of the structure represented in FIG. **5**.

DESCRIPTION OF THE ILLUSTRATIVE EMBODIMENT

As required, a detailed illustrative embodiment of the present invention is disclosed herein. However, physical communication systems, data formats, and operating structures in accordance with the present invention may be embodied in a wide variety of forms, some of which may be quite different from those of the disclosed embodiment. Consequently, the specific structural and functional details disclosed herein are merely represen-

tative; yet in that regard, they are deemed to afford the best embodiment for purposes of disclosure and to provide a basis for the claims herein which define the scope of the present invention.

Referring initially to FIG. **1**, a series of remote terminals **T1**–Tn (telephone instruments) are represented (left). The terminals **T1**–Tn are generally similar and accordingly only the terminal **T1** is shown in any detail. The indicated terminals **T1**–Tn represent the multitude of telephone terminals existing in association with a communication facility CO which may comprise a comprehensive public telephone network.

The communication facility CO, along with the individual terminals **T1**–Tn, is coupled to a central processing station CS generally indicated by a dashed-line block. Generally with regard to the station CS, individual terminals **T1**–Tn are interfaced either with a processor P (upper right) or one of several live-operator stations OS1–OSn (lower left) through a call receiver unit CU and a switch SW. Essentially, the processor P and the switch SW cooperate (line **9**) to control interfaces, with the processor P providing interface formats either (or both) to automate an interface or prompt a live operator at a station OS1–OSn. Note that the interface formats are stored as described below in the processor P.

In accordance herewith, individual telephone calls are preliminarily processed on the basis of signal-represented call data to identify a specific operating format for a station or the processor P. The preliminary processing may invoke screening tests to impose conditions or establish a test criteria for the switch SW to determine the acceptability of the call to interface with a specific operating format.

Calls are selectively processed according to a specific operating format as indicated by call data. At any instant of time, the collective interface may involve several thousand calls simultaneously being processed through ports of the processor P. Exemplary selected formats of the processor might include: public polls, lotteries, auctions, promotions, sales operations and games. Accordingly, the stations OS1–OSn may comprise a substantial number and the processor P may take the form of a sizable computer capable of simultaneously processing many calls involving several different formats. Although numerous possible configurations are available, for purposes of explanation, the processor P is illustrated simply as a block with multiple ports. Note that while the switch SW and the processor P may be integrated in a single system, they are separately illustrated to isolate the detailed structure and process of the present invention.

Input lines LI1 through LIn from the call receiver unit CU enter the switch SW to provide calling data and communication paths. Output lines LO1 through LOn function between the switch SW and the processor P as lines LS1–LSn operate to serve the stations OS-1–OSn. Note that various multiplexing techniques are well known in the telephonic art to communicate call data and may be employed in the system.

Considering the system somewhat summarily, individual calls originating at the terminals **T1**–Tn are coupled through the communication facility CO and the call receiver unit CU to the switch SW. Call data, representative of calls, actuates the switch SW to preliminarily process each call based on the desired format. For example, depending on the desired format (indicated by the called number and/or the equipment data signals) calls are selectively coupled and processed. Furthermore, record data is assembled for storage.

Considering the system of FIG. **1** in somewhat greater detail, the exemplary telephone terminal **T1** includes a handpiece **10** (microphone and earphone) and a panel **12** provided with a rectangular array of push buttons **14** in a conventional configuration. Of course, the handpiece **10** accommodates analog signals while the panel **12** is a digital apparatus. Generally, the handpiece **10** serves to manifest analog or voice signals to a caller.

In accordance with conventional telephone structure, alphabetic and numeric designations are provided on the buttons **14**. For example, several of the buttons **14** carry three letters along with a decimal digit. Specifically, the button designated with the numeral "2" also carries the letters "A", "B" and "C". Thus, the buttons **14** encompass the numerals "0–9" two symbols, and the alphabet except for the letters "Q" and "Z". Consequently, the buttons **14** substantially accommodate the entry of decimal and alphabetic data.

At this stage, some specific aspects of the communication facility CO are noteworthy. Essentially, with telephonic dialing, the communication facility CO couples selective terminals (from the multitude of terminals **T1**–Tn) to the call receiver unit CU. In that regard, the unit CU at the central station CS may be reached by any of a plurality of called numbers. For example, the call unit CU might be reached by any of twenty telephone dialing numbers, each associated with a specific operating format of the processor P. One called number or set of numbers might be associated with an auction format of the processor P. Another number or set of numbers might be associated with sales operating formats. Still another called number or set of numbers might identify a game format, and so on.

Incoming calls to the call receiver unit CU are identified by call data in accordance with telephone system techniques. As described below, the call data may specifically include digital signals representative of the called number (DNIS), the calling number (ANI) (terminal number), and the terminal equipment.

In addition to attaining a preliminary interface with a selected format, individual calls may be screened based on the called number (identifying an operating format) and the calling number (caller identification) or the equipment. That is, the system of the present invention is based on a realization that signal-represented call data can be effectively utilized to selectively interface individual callers at remote terminals with specific operating formats of a data processor.

Considering the call data in somewhat greater detail, in accordance with current telephone systems, the communication facility CO may provide signal-represented call data for: the "called" number, the "calling" number, and the equipment involved, e.g. "pulse" or "tone" terminal. Specifically, operating telephone equipment termed "DNIS" automatically provides the called telephone number in digital form from the communication facility CO. Somewhat similarly, existing telephonic equipment designated "ANI" automatically indicates the caller's (calling) number in digital signal represented form. Generally, time shared lines carry such call data and also may provide call data indicating equipment. Thus, the call unit CU may receive the called number, the calling number, and a calling equipment designation (pulse or tone), collectively termed call data, which data is utilized to establish control functions, as for

example to select an operating format for a station OS-1–OSn or the processor P.

As described in detail below, call data is registered in the switch SW to perform distinct control operations. Specifically, a selection section **16** of the switch SW identifies a specific desired format for the stations OS-1–OSn or the processor P. Depending on the format, a testing section **18** of the switch SW may screen calls for interface connections.

Recognizing that the possibilities are great, formats for calls in accordance with the disclosed embodiment may be of three different classes. Specifically, call formats may specify any of the following operations:

1. couple to live operator station if possible or in accordance with a predetermined criteria; if no operator station available, couple to processor;
2. interface to processor;
3. either above format, but selectively re-couple to live operator station or processor depending on secondary conditions.

The ramifications of individual formats within the above classes may vary considerably; however, some examples will illustrate possibilities. A marketing format (class **1**) might interface callers to a live operator if an operator is available. Upon receiving a call, the operator station OS1–OSn (FIG. **1**) also receives and displays prompting format data for the attending operator. If an operator is not available (all stations OS1–OSn busy) the system provides an interface with the processor P and a format as to record the data for a return call by an operator. Alternatively, the processor completes the transaction with data provided by the caller that may be digital, digital and voice, or voice.

In a game format, say of class **2**, a caller may be limited to interface the processor P. The interface may be contingent on initial test conditions, e.g. call data, caller record, time, etc.

Formats of class **3** involve a switch between live operator and processor depending on secondary conditions. For example, a polling format may switch from the processor P to an operator station OS1–OSn if the caller fails to provide digital data in a responsive form. Alternatively, an operator may command a switch to the processor P upon identifying a specific caller from whom data is to be taken.

In the illustrative system of FIG. **1**, an operating process is executed as illustrated in FIG. **2**. Each incoming call prompts a preliminary query as indicated by a block **20** concerning the availability of a line or port. In the absence of an available line, a busy signal is provided as indicated by the block **22**. Alternatively, an available line results in a preliminary interconnect as indicated by a block **24** setting a conditional connection into operation.

As indicated by a block **26**, during the screening or testing interval (typically measured in seconds or fractions of seconds) the caller remains on line and may receive a message. That is, the caller might hear silence or may continue to hear the traditional telephonic ringing sound. Alternatively, the caller might be given a brief vocal message to "stand by" as indicated by the block **26**. In any event, the caller is held "on line" while the process continues.

With a call on a line, the communication facility CO (FIG. **1**) provides signal-represented call data, e.g. the called number, the calling number, and the equipment designation. As indicated by block **28** (FIG. **2**) signals representative of the call data are captured to perform preliminary control and processing operations as will now be considered. Note that the selected formats will fall within one of the classes as stated above.

The initial test is illustrated by a query block **25** representing an operation to distinguish calls of class **1** (operator) and class **2** (processor). Calls for a format seeking an operator prompt a "yes" response from the block **25** and proceed to the test of a block **27**, "is an operator available?". A "yes" determination advances the process to an operation indicated by a block **29**. Specifically, the block **29** represents the operations of coupling a caller to an operator station and transferring the appropriate format data to the station for prompting the operator. If no operator is available (block **27**) the process proceeds with automated control to attain an interface in accordance with an appropriate format. Specifically, a control word is fetched (block **36**) to establish an operating format for interfacing the call. In that regard, the specified format may be very simple. For example, the call simply may be prompted to indicate identification for a return call. Alternatively, the format may incorporate conditions or other complications as explained below.

Returning to the query block **25**, if the call is to be coupled to the processor, an initial test operation is indicated by a block **30**. A validity test is performed, for example, a list of calling numbers may be compiled that are to be denied access to any interface with the processor P. Negative calling numbers may result either by the choice of the person responsible for the calling number terminal, or by the choice of the service operating the processor P (FIG. **1**). For example, an accumulation of prior improper transactions from a terminal designated by a specific telephone number may provide a basis for complete disqualification. Equipment also may disqualify.

Recognizing that various circumstances may be involved with respect to the total disqualification of a calling terminal, in accordance herewith the test involves formulation of a validity bit as indicated by the query block **30**. Acceptable calls set the validity bit at a binary "1".

If the calling terminal is invalid, ("no" from the block **30**) the call is rejected as indicated by the block **32** with or without a message and the line is released as indicated by the block **34**. Note that the time interval involved is very short and the rejection message may take various forms including a verbal comment, a busy signal or simply a disconnected signal.

If a positive validity bit ("1") is formed at the junction of the query block **30**, a control word is fetched under command of the called number as indicated by the block **36**. As described in detail below, a control word is available for each operating format of the processor P and is utilized to impose the conditions for an interface and the terms of any associated billing.

As indicated in FIG. **2**, the fetched control word of the block **36** prompts an inquiry as to the conditions attendant the selected operating format as indicated by a query block **38**. That is, in the process, the query of block **38** determines whether further conditions are imposed for attaining interface with the processor P. If no further conditions are imposed, the format is initiated by pursuing the connected interface as indicated by a block **40**. Also, as indicated by a block **42**, the call is logged or recorded as with respect to billing data for example.

If access to a format involves conditions ("yes" from the query block **38**), tests are specified as illustrated by a block **44**. That is, conditions for the interface are specified by the block **44**. Of course, the specific tests may involve various criteria; however, in the illustrative embodiment, the conditions involve time, history and demographics. Each exemplary condition will now be considered somewhat preliminarily.

In the disclosed embodiment, time tests involve testing the time of the call against certain limitations. For example, it may be desirable to limit some formats to specific time intervals as in relation to a television broadcast, a real time auction and so on. Note that the time tests also may be related to specific terminal control and geographic areas treated on the basis of telephone area codes. Specific examples will illustrate.

Assume an operating game format that propounds questions to a caller based on knowledge of a particular television program. The program may be broadcast at different times in different geographic areas, and as a consequence it may be desirable to limit calls interfacing the processor format depending on the area code of calling numbers. Accordingly, time tests may involve solely the instant time, or various combinations of time and call data. The specific test is determined as indicated by a block **46** (FIG. **2**) imposing detailed operating instructions for the format. The test results are then correlated as represented by a block **48**.

As indicated above, in accordance with the described embodiment, another test involves a record as for example directed to the station identified by the calling number. As an example, the record might take the form of either a negative or a positive file (for an individual format). In that regard, all formats involving "pay to dial" (e.g. 976, 900 etc.) calls might be conditioned as a group. Generally, in the case of a negative file, certain numbers are recorded that are to be denied access to a particular operating format. In the case of a positive file, access to the operating format is available only to calling numbers listed in the file.

Considering exemplary implementations of the system, a negative file may be based on limited or restricted use (as in the case of a lottery) or prohibitive use (telephone terminal owner choice). Formats accessible on a "one-time only" basis also may be controlled by negative lists. Thus, an operating format may be inaccessible to a terminal, or may be accessible a specified number of times during a specified interval, e.g. three accesses per week. The historical test is symbolized in FIG. **2** by the query block **50** to conditionally actuate the related tests as indicated in the block **48**. History limitations also may involve purely format limits. For example, a give-away or dial-free format may be limited to some predetermined number of calls for a period, e.g. ten thousand calls per day. Thus, limits can be imposed on the economic exposure of a format.

Moving from the historic considerations, demographic tests may be specified as in relation to the geographic area manifest by the area code of the calling number. To consider a specific example, a public opinion poll may be conducted in which a particular geographic balance is defined. In such an operating format, calls may be accepted only until particular quotas are attained with respect to specified area codes. Such tests in the process are indicated by the query block **52**, again to instruct the correlation block **48**.

With the requisite tests established by selection of a format, the block **48** indicates resolving the acceptability of the call for the selected interface format. If the call is accepted, the process moves to initiate the selected format interface as indicated by the block **40**. Conversely, if the call is to be rejected, the process moves to the step indicated by block **32**, i.e. reject the call as with a message and release the line.

If a call is accepted, as represented by the block **40**, there is a possibility that an established format may be aborted in favor of a different format. For example, interfacing the processor P, a qualified caller may fail to communicate digitally with the result that transfer to a live operator is commanded. Also, in certain situations, a connection to a live operator is to be terminated in favor of an interface to the processor. In either event, an existing format is terminated in favor of a fresh format. That phase of the process is illustrated by an "abort" line from the block **40** returning to the block **28**. Thus, the process returns to re-assign the caller to a new format in accordance with fresh data. Thus, transfers according to class **3** operation are implemented along with the other classes of operation by the switch SW (FIG. **1**).

An exemplary detailed structure of the switch SW (FIG. **1**) for executing the process of FIG. **2** is represented in FIG. **3**. In that regard, individual telephone calls are manifest from the call receiver unit CU (FIG. **1**) comprising existing equipment as well known in the prior art. The call data is supplied through a line **60**, upper left, FIG. **3**. Note that the represented single line **60** is merely symbolic of a channel to carry call data and provide direct telephone communication.

Generally, the system of FIG. **3** illustrates elements of the switch SW of FIG. **1** for processing an individual call. As indicated above, the system of the present invention involves the simultaneous processing of many calls with the possibility that numerous calls are simultaneously being tested for a connection as explained above. Consequently, although the system of FIG. **3** is illustrated with respect to testing a single call, it is to be understood that sequential or parallel operations and multiplexing techniques, as well known and widely practiced in the computer field, are utilized to accomplish multiple processing operations as are described below with reference to FIG. **3**.

The line **60** (FIG. **3**, upper left) enters a line capture unit **62** through which signal-represented call data is supplied to a call data register **64**. Accordingly, the call data is registered to be available for processing operations as explained generally with reference to FIG. **2**.

The line capture unit **62** also is connected to a control unit **66**. Structurally, the control unit **66** may take the form of various computer facilities incorporating memory and logic capability to sequence and control specific functions as explained below. Generally, the control unit **66** implements specific formats which may involve coupling a caller either to a live operator station OS1–OSn or to the processor P. In that regard, the control unit **66** provides a series of timing signals **t1–t6** to sequence the operations of individual component blocks as illustrated. Note that to preserve clarity in FIG. **1**, connections of timing signals **t1–t6** are not illustrated. Also, the control unit **66** is connected to the operator stations OS1–OSn (line **67**) to receive signals indicative of the availability of stations.

In addition to logic for controlled switching as described, the control unit **66** specifically includes a call register **68**, a control register **70** and test control logic **72**. The control register **70** receives format control

words specified, as by the called number and having a form as illustrated in FIG. 4.

Recapitulating, each of the operating formats has a control word for defining any access conditions or limitations to accomplish a specific format, e.g. connection to an operator station OS1–OSn or to the processor P (FIG. 1). The formats may vary considerably; however, a few examples are the following:

Class 1, connect the live operator if available and provide prompt data for the XYS Company telemarketing program, if operator not available, cue caller: "All operators are busy at the moment, but we will return your call as soon as possible. Please touch your telephone buttons '2' and '4' to identify yourself as twenty-four for the return call".

Class 2, couple qualified callers to computer P for polling interface.

Class 3, couple callers to computer P for the RST Company telemarketing program, however, transfer to live operator (and prompt) if caller is not responsive.

These formats are established by control words that are selected on the basis of call data. The control words are sixteen bits, illustrated as the first sixteen bits (1–16) registered as shown in FIG. 4. An additional group of registered bits (17–20) are provided from call data.

The initial three registered bits in the control register (FIG. 4) serve as test command bits respectively for a time test, a history test and a demographics test. The presence of a "1" bit in any of the first three bit locations specifies the requirement for testing compliance to specified conditions. A "0" bit indicates no test.

The bits "4 through 7" in the control register constitute a field 74 and specify time conditions in relation to the instant time of the call. The field 74 may specify eight distinct time conditions. For example, exemplary specified conditions for a format might be as follows:

Accept calls between 7:00 and 18:00,

Accept calls on Thursday between 9:00 and 10:00,

Accept calls from area code 213 on Wednesday between 15:00 and 16:00,

Accept calls from area code 602 on Wednesday between 16:00 and 17:00.

Essentially, the time condition field 74 (activated by the time bit "1" - first bit position) defines specific intervals during which calls will be accepted for the specific called number and may be further limited by the area codes. A wide range of possibilities are available to accommodate specific programs for individual formats.

A field 76 in the control register embraces bits "8" and "9" and defines the conditions for access to the format based on historical considerations. Thus, two bits are provided to indicate four possible historical limitations. Again, the test is specified by a "1" bit, in this instance in the second bit location of the register 70. The following limitations are exemplary of many possibilities as related to a single telephone number:

Accept one call per day (per caller),

Accept one call per week (per caller),

Accept one call per month (per caller),

Accept one call during any three-day period (per caller),

Accept only 10,000 calls (per format).

Continuing with respect to the contents of the register 70, as illustrated in FIG. 4, bits "10" and "11" constitute a field 78 specifying demographic test limitations. Again, a few examples will illustrate the various possibilities:

Accept calls only from area code 213,

Accept calls from area codes 213, 818 and 619,

Accept only 1,000 calls from area code 213,

Accept calls from area code 213 with the prefix numerals 619.

Again, the demographic test is imposed only upon the existence of a "1" bit, in this instance in the third bit of the control word. As in the other cases, specific possibilities are considerable.

The bits "12" through "16" of the control word constitute a field 80 and designate a selection code for the identified format. These five bits enable a substantial number of formats to be designated and coded with respect to various classifications. For example, calls of the class 1 specifying a desirable connection to a live operator station OS1–OSn might be encoded in a "000" decimal series, e.g. "001" indicates XYZ Company telemarketing program, "034" indicates RST Company program, and so on. Accordingly, a "0" in the most significant digit specifies a live operator format. Similarly, lottery formats might be encoded in a "100" decimal series, e.g. "101, 102, 103 . . . 110, 111, 112". . . and so on; auctions might be designated in a "200" series, e.g.: "201, 202, . . . ". By using decimal equivalent coding formats for various categories, exclusions may be concisely stated. For example, a calling number may be excluded from all lottery operating formats simply by the specification of decimal "100" in association with the calling number.

The data, as illustrated in FIG. 4 is loaded into the control register 70. Again, the first sixteen bits comprise the format control word and are provided from a look-up table 84 (FIG. 3, right, central) upon being addressed by call data from the register 64.

The last bits (bits 17–20) stored in the control register 70 are provided from an equipment and billing instruction index 86. That is, in response to the signal-represented call data indicating the called number and the equipment, the look-up table 84 and the index 86 supply data for loading the control register as indicated above.

While the control register 70 is loaded to specify the operation of the system, the call register 68 in the control unit 66 receives signals for additional control and to formulate a record of the call. Specifically, as represented in FIG. 5, the contents of the call register 68 includes an initial validity bit 88 for indicating that the called number is either on a positive list or is not on a negative list. The determination of the validity bit for location 88 is made by reference to a memory 90 (FIG. 3, central) addressed by the calling number.

While the calling number addresses data to indicate a validity bit, specific format exclusions also may be indicated as explained above with respect to certain formats. For example, certain classifications of formats or specific formats (as a lottery) may be identified as inaccessible for certain telephone terminals as identified by calling numbers. Other than lottery formats, certain discretionary formats also may initiate control to limit access. Accordingly, a field 89 in the call register 68 (FIG. 5, bits "2" through "6") is provided from the memory 90, addressed by the calling number to specify format exclusions. That is, the calling number addresses the memory 90 to load the field 89 and specify limitations. Consider a few examples of format exclusions or limitations for a calling number:

No lottery formats,

One lottery format per week,

Two lottery formats per month of total cost under $25.00,

No auction sales,

Auction sales only with caller entered code I.D. 763.

Again, it will be apparent that many possibilities exist in applying various coding techniques, the above merely being exemplary. Also, as indicated above, a format may be void of any limitations or restrictions. In that event, as explained above, a connection or interface is promptly commanded by the format code.

The bits "7" through "26" stored in the call register **68** (FIG. **5**) constitute a field **91** and indicate the time of a call. Signals representative of the instant time of a call to load the field **90** are provided from a time clock **92** (FIG. **3**, upper left). Signals from the time clock **92** may be in a Julian code and are provided to the call register **68** and also to a time test logic network **94** (lower left).

The last bits (27–30) in the register **68** are provided from the call data. The bits "27" and "28" indicate format billing data and comprise a field **82**. Again, representations are coded; however, with respect to the field **82** information is derived from the called number. For example, an "800" called number may indicate no billing with the representative code being stored in the field **82**. As another possibility, a "976" prefix number, or "900" number, may indicate a specific charge in relation to the identified format.

The bits "29" and "30" comprise a field **83** and may actuate a special form of the selected format. In the disclosed embodiment, the field **83** registers call data, as to indicate that the calling terminal is a "pulse" (rotary dial) signal unit or a "tone" (touch) signal unit. In the instance of a rotary terminal, the format program may be modified to accommodate "pulse" signal operation or inject operator communication with a transfer to one of the stations OS1–OSn.

Recapitulating to some extent with regard to the composition of the call record word in the register **68** (FIG. **5**), the memory **90** (FIG. **3**) is addressed by calling number data to provide data for the validity bit location **88** and the format-exclusion field **89**. The time of call is stored in the field **91** from the clock **92**. The billing and equipment data are provided by the index **86** in response to "calling" data signals.

Another element of memory, specifically, a recent activity storage **98** (FIG. **3**, lower right) is separately illustrated for convenience of explanation. Essentially, the storage **98** receives words from the call register **63** to maintain a record of interface calls. The recent activity storage may periodically be purged to permanent storage if desired. Thus, the recent activity storage **98** accumulates an activity record of all interface participants with respect to specific formats and is utilized in the history test for determining that an instant calling terminal is within the specified historical limitations as provided from the memory **90**.

The activity tests are performed by a history test logic network **100** (FIG. **3**, lower central). In a related context, the demographics test as explained in detail above is performed by a demographics test logic network **102**. The results of the test logic networks are communicated to the test logic **72** in the control unit **66**. As a consequence, a switch unit **105** is actuated to either operatively couple the line **60** into a port of the processor P (FIG. **1**) or reject the call. If a call is accepted for an interface, a signal is supplied from the test control logic **72** through a line **107** to the switch **105** during the interval of the timing signal **T6**. The signal in the line **107** also is supplied to a format address register **109** for addressing the processor P. The register **109** stores select data signals to address a specific operating format of the processor P.

Recapitulating to some extent, call data indicates an interface format of the processor P (FIG. **1**) with associated limitations, conditions and billing provisions. Call data also indicates possible format limitations or conditions for a calling number. The system processes the data with respect to the conditions and limitations to selectively enable interface operations. Essentially, the call data specifies a format (processor or operator) and any conditions relating to the format. Representative data accordingly is provided from the look-up table **84** and the memory **90** to the control register **70** and the call register **68** respectfully. Preliminary conditions may or may not be involved; however, qualified calls for an operator involve tests of availability within the control unit **66** according to data received from the stations OS1–OSn (line **67**). As a result, calls are either interfaced to an operator who receives a format prompt, or interfaced to the processor according to a specified format. Thereafter, a shift may command a redetermination and a transfer as described in detail below.

In view of the above structural and logic description of the system of FIG. **3**, the process as described with respect to FIG. **2** and the stored control word forms as described with respect to FIGS. **4** and **5**, a comprehensive understanding of the described embodiment may now best be accomplished by assuming an exemplary call and treating the individual responsive steps. Accordingly, assume the occurrence of a call as manifest on the line **60** (FIG. **3**, upper left). Further, assume that the called number, "976 513 7777" designates a lottery format with limited access. Details of the limited access will be treated below.

Upon occurrence of the call, the line capture unit **62** seizes a line relationship and signals the control unit **66**. Immediately, an interval of time signal **t1** is initiated and the register **64** is loaded with the called number ("900 513 7777"), the calling number ("415 318 4444") and the equipment designation (tone or no tone). To the caller, the operations as now described involve an almost imperceptible delay.

During the following interval of timing signal **t2**, the call register **68** and the control register **70** are loaded as illustrated respectively in FIGS. **4** and **5**. Specifically, the called number and equipment designation specify data to load the control register **70**. The calling number ("415 318 4444") from the register **64**, prompts the memory **90** to load the validity bit **88** and the format exclusions in the field **89** of the register **68**. Concurrently, the time clock **92** loads the field **91** with signals representative of the current time.

If the call register **68** does not receive a validity "1" bit, the calling number is indicated to be barred with a consequence that the line is released by the control unit **66**. In that regard, a voice generator **106** (FIG. **3**, left central) may be actuated by the control unit **66** branching to the operation of timing signal **t6**. Accordingly, a message of denial may be provided on the line **60** prior to release of the line. Note that the voice generator **106** may be variously used to prompt or inform callers in certain preliminary selection operations supplemental to the specific operations disclosed below.

As indicated above, concurrently with the loading of the call register **68** (timing signal **t2**), the control register **70** also is loaded. Specifically, from the register **64**, the

called number cues the look-up table **84** to fill most of the control register (bits "**1**" through "**16**" FIG. **4**) The fields **82** and **83** are supplied from the index **86**.

That is, distinct from the fields loaded into the control register **70** from the look-up table **84**, the fields **82** and **83** are supplied from the index **86**. In that regard, assume the called number (area code 976) indicates that the charge for the service of the call will be billed through the caller's telephone records. Assume that the field **83** indicates a "tone" terminal effective for a conventional digital interface.

At this point, some still further assumptions will be made to pursue the explanation of the detailed operations. Specifically, assume that the format specified by the called number ("900 513 7777") is a lottery format and includes limitations with respect to time, history and demographics. Accordingly, the initial three bits of the control word all will be "**1**" bits in the control register **70**.

Assume further that the time conditions specified by the field **74** (FIG. **4**) limit calls from area code 415 to days other than Sunday. Assume that the history field **76** of the control word imposes a limitation of one call per day per calling station. Assume that the demographics field **78** excludes any call from area codes "512", "412", "812", . . . (not "415"). Finally, assume the selected format (field **80**) designates a specific lottery format, that is lottery "**128**".

In addition to registration of the data sets detailed above, because a history test is specified, the recent history storage **98** is cued during the interval of timing signal **t3**. The operation is through the memory **90** by the control unit **66** to prompt the supply of historical data (previously registered record words) for the telephone terminal designated by the calling number ("415 318 4444"). Specifically, during the interval of timing signal **t3**, the storage **98** supplies data on the calling number to the history test logic network **100**. Such data is compiled into a test format as to indicate the number of calls per day, per week, and so on. Note that aggregate call totals may also be supplied as a test criteria. Thus, the control unit **66** coordinates the test criteria data preparatory to the test operations of the individual logic networks **94**, **100** and **102**.

To summarize, in accordance with the above assumptions, the test control logic **72** is set up to coordinate the following specific logic tests:

Time limitation test by network **94**: accept calls from area code 415 except on Sunday,

History limit test by network **100**: accept only one call per day per station,

Demographics test by network **102**: accept no calls from area codes 512, 412, 812 . . . (415 not listed).

As explained above, in addition to the limitations specified, in relation to the format, further limitations may be specified by the calling number. Such limitations are specified by the field **89** in the register **68** (FIGS. **3** and **5**). In the instant example, assume that according to the record word, participation in the lottery format is limited to the interval between 10:00 a.m. and 3:00 p.m., e.g. when minors are in school. The code for such a format is supplied during the interval of timing signal **t3** from the field **89** of the call register **68** to further establish the set-up of the logic **94** acting through the test control logic **72**.

Recapitulating with regard to the test control logic **72**, essentially a program is defined imposing each of the limitations that are specified by the call data in sufficient detail that comparison tests are expediently performed by the networks **94**, **100** and **102**. It is stressed, as indicated above, that the tests are selectively performed only in the event a "**1**" bit appears in the representative first three bit locations of the control word format. In the illustrative example, all the tests were commanded and accordingly the test control logic **72** sets up the condition for tests to be performed by the networks **94**, **100** and **102**, all during the interval of timing signal **t3**. Of course, the specific example represents one possibility of a substantial number of programs that might be specified to the system.

With the test formats established in the test control logic **72**, the logic networks **94**, **100** and **102** are driven during the interval of test signal **t4** to execute a program in accordance with the assumed example. The process may be variously implemented in logic using well known techniques and is detailed in FIG. **6**. Consider the time test of the network **94**. The time test logic network **94** approves an interface only if: the call is not from area code "415" on a Sunday and furthermore the call occurs between the hours of 10:00 a.m. and 3:00 p.m. As indicated in FIG. **6**, a decision block **120** resolves the area-code "415" time test. If the area code is not "415", the logic proceeds to the next query block **122**. Alternatively, if the area code is "415" the day must be tested against Sunday as indicated by the query block **124**. An affirmative indication from the Sunday test of block **124** prompts a rejection as indicated by the block **126**.

If the Sunday test of block **124** is passed, the program imposes another time test, that is the time-of-day test as indicated by the block **122**. Again, a negative result prompts a rejection; however, a positive result involves the next step as indicated by the block **128**.

Note that the operations designated by query blocks **120**, **122** and **124** are performed by the time test logic network **94** (FIG. **3**). The next test of the block **128** is performed by the history test logic **100**. The block **128** (FIG. **6**) involves a determination of whether or not the instant call is the first for the calling terminal on the instant calendar day. If not, the limitations are exceeded and the call is rejected. If the test is passed, the process next involves the demographic test logic network **102** (FIG. **3**) to determine whether or not the call originated from an excluded area based on the calling number area code.

Area controls are illustrated by the query block **130** of FIG. **6**. Specifically, the demographics test logic network **102** determines whether or not the current call is from a denied area. If so, the call is rejected as indicated by the block **126**. Alternatively, if the area is not excluded, as illustrated by the block **134** in FIG. **6**, the interface is accepted. In the instant case, the area "415" is acceptable.

In the operation of the system as illustrated in FIG. **3**, the logic networks **94**, **100** and **102** indicate test results to the test control logic **72** during the interval of the timing signal **t5**. The logic **72** correlates the test result for action by the control unit **66**. If the imposed conditions are met (or if there are no conditions) the control unit **66** actuates the switch unit **105** and the address register **109** through the line **107** to perfect the interface from the line **60** (upper left) to either a port in the processor P (FIG. **1**) or one of the operator stations OS-1–OSn. Essentially, the switching operation occurs during the interval of the timing signal **t6**. Concurrently, the address register **109** specifies the select oper-

ating format as stored in the processor P for direct use in an interface with a caller, or to be retrieved and supplied through the switch SW to prompt an operator at a station OS1–OSn.

Also during the interval of the timing signal t6, the contents of the call register **68** is stored in the recent history storage **98**. Note that billing data is stored with the call words and may be selectively extracted from the storage **98**. At the termination of the timing signal t6, the interface endures until there is a "disconnect" or an "abort".

If the processor P senses the existence of conditions specifying a shift between a processor interface and a live operator communication, the control unit **66** is actuated as indicated through line **115**. Note that the abort signal is formed either in response to predetermined conditions in an interface with the processor P, or on command from an active operator station. The signal is also supplied to the look-up table **84** which becomes active if a transfer is conditional. That is, if a transfer is conditional, the tests as described above may be invoked. Conversely, if the transfer is unconditional, the control unit **66** simply actuates the switch **105** to make the change and prompts the format address register to establish the desired format or prompt pattern for an operator.

The formats may involve various records, however, in accordance with the system of the present invention affords considerable flexibility to program individual conditions and limitations for each interface format based on the call data (calling number and called number). An interface may involve no conditions or conditions may be imposed from the called number (format selection), the calling number, or both. Accordingly, effective control may be imposed depending upon the service requested as manifest by an individual format, the instant time, the history of use and the demographics involved. The imposed limitations may be non-existent or may involve a relatively complex test pattern as explained in detail above.

In the disclosed embodiment, an effective record of calls is accumulated in the recent history storage **98**. Thus, a composite and detailed record is accumulated of individual calls as executed.

It is to be appreciated that numerous formats may be implemented and controlled utilizing the principles of the system as illustrated above. Accordingly, it is to be understood that the system of the present invention should be interpreted in accordance with the claims as set forth below.

What is claimed is:

1. An interface control system for use with, (1) a communication facility including remote terminals for individual callers, wherein said remote terminals may comprise a conventional telephone instrument including voice communication means and digital input means for providing data, (2) a multiple port, multiple format processor for interfacing a substantial number of callers in any of a plurality of formats to concurrently process data, and (3) a plurality of live operator stations with prompting capability for a plurality of formats, said interface control system comprising:

call data means for receiving signal-represented call data from said terminals including DNIS automatically provided by said telephonic communication system;

selection means coupled to said call data means for selecting one of said formats under control of said call data including DNIS to thereby further specify imposed conditions that must exist for a connection of a call either to said multiple port, multiple format processor or one of said live operator stations in accordance with said select one of said formats, at least one of said formats having at least one imposed condition; and

interconnect switch means for providing format data and controlling connections from a calling remote terminal to a port of said multiple port, multiple format processor or one of said live operator stations under control of said selection means.

2. A system according to claim **1** further including test means to specify test conditions for certain of said formats and means to test compliance with said conditions to further control said interconnect switch means.

3. A system according to claim **2** wherein one of said test means comprises means for executing a test based on the time of a call.

4. A system according to claim **2** wherein one of said test means comprises means for executing a test based on the history of the calling remote terminal.

5. A system according to claim **2** wherein one of said test means comprises means for executing a test based on the demographics of the calling remote terminal.

6. A system according to claim **1** wherein said selection means includes a look-up table for specifying said formats addressed by call data.

7. A system according to claim **1** wherein said selection means includes a control storage location and means for setting control data in said control storage location responsive to said call data.

8. A system according to claim **1** further including a voice generator means for prompting a caller.

9. A system according to claim **1** further including means for storing data representative of calls.

10. A system according to claim **9** wherein said means for storing includes means for storing billing data.

11. A system according to claim **1** further including means to provide an abort signal, the system being responsive to said abort signal to reactuate said interconnect switch means for providing alternative connections with format data.

12. A system according to claim **11** further including test means to specify test conditions for certain of said formats and means to test compliance with said conditions to further control said interconnect switch means.

13. A system according to claim **1** wherein said selection means selects under control of DNIS signals.

14. A system according to claim **1** wherein said selection means selects under control of ANI signals.

15. A system according to claim **1** wherein said selection means selects under control of equipment type signals.

16. An interface control system for use with, (1) a communication facility including remote terminals for individual callers, wherein said remote terminals may comprise a conventional telephone instrument including voice communication means and digital input means for providing data, (2) a multiple port, multiple format processor for interfacing a substantial number of callers in any of a plurality of formats to concurrently process data, and (3) a plurality of live operator stations with prompting capability for a plurality of formats, said interface control system comprising:

call data logic for receiving signal-represented call data from said terminals including DNIS automati-

cally provided by said telephonic communication system;

selection logic coupled to said call data logic for selecting one of said formats under control of said call data including DNIS to thereby further specify imposed conditions that must exist for a connection of a call either to said multiple port, multiple format processor or one of said live operator stations in accordance with a select one of said formats at least one of said formats having at least one imposed condition;

test logic coupled to said selection logic for testing the imposed conditions to provide approval signals; and

interconnect switch means for providing connections from a calling remote terminal to a port of said multiple port, multiple format processor or one of said live operator stations under control of said selection logic and under control of said approval signals from said test logic.

17. A process for interfacing (1) a telephonic communication system including remote terminals either with (2) a multiple port, multiple format data processing system, said multiple port, multiple format data processing system for concurrently processing data from said remote terminals according to a plurality of formats, at least one of said formats having at least one condition for a calling terminal, or (3) one of a plurality of operator stations with prompting capability for a plurality of formats, and wherein said telephonic communication system provides call data signals, as to indicate called and calling numbers, said process including the steps of:

receiving said call data signals from said telephonic communication system for a calling remote terminal indicative of DNIS and ANI automatically provided by said telephonic communication system;

selecting a processing format either for said multiple port, multiple format processing system or one of said plurality of operator stations for the calling remote terminal under control of said data signals as the selected format;

testing the selected format in relation to said call data signals; and

conditionally interfacing said calling terminal to said multiple port, multiple format data processing system for execution of said selected format or to one of said plurality of operator stations under control of said testing of call data signals.

18. A process for interfacing (1) a telephonic communication system including remote terminals either with (2) a multiple port, multiple format data processing system, said multiple port, multiple format data processing system for concurrently processing data from said remote terminals according to a plurality of formats, at least one of said formats having at least one condition for a calling terminal, or (3) one of a plurality of operator stations with prompting capability for a plurality of formats, and wherein said telephonic communication system provides call data signals, as to indicate called and calling numbers, said process including the steps of:

receiving said call data signals from said telephonic communication system for a calling remote terminal indicative of DNIS and ANI automatically provided by said telephonic communication system, wherein said plurality of formats consist of at least one pay to dial format and one 800 toll free format;

selecting a processing format either for said multiple port, multiple format processing system or one of said plurality of operator stations for said calling remote terminal under control of said call data signals as the selected format;

testing the selected format in relation to said call data signals; and

conditionally interfacing said selected format to said calling remote terminal under control of said testing of said call data signals.

19. A method for interfacing (1) a telephonic communication system including individual remote calling terminals for individual callers with (2) a multiple port, multiple format data processing system, said multiple port, multiple format data processing system for concurrently processing data from said remote terminals according to a plurality of formats, at least one of said formats having at least one imposed condition for said remote terminals calling to interface said data processing system, and (3) a plurality of live operator attended terminals, and wherein said telephonic communication system includes the capability of providing call data signals, said method comprising the steps of:

receiving said call data signals from said telephonic communication system for said remote terminals calling to interface said data processing system including DNIS automatically provided by said telephonic communication system;

selecting for said remote terminals, a select processing format from said plurality of formats of said multiple port, multiple format data processing system under control of said call data signals including DNIS provided by said telephonic communication system;

testing said select processing format in relation to said call data signals;

conditionally interfacing said select processing format to said remote terminals under control of said testing in relation to said call data signals; and

selectively terminating certain select calls from said remote terminals in favor of said operator attended terminals.

20. A method for interfacing (1) a telephonic communication system including individual remote calling terminals for individual callers with (2) a multiple port, multiple format data processing system, said multiple port, multiple format data processing system for concurrently processing data from said remote terminals according to a plurality of formats, at least one of said formats having at least one specified condition for said remote terminals calling to interface said data processing system, and (3) a plurality of live operator attended terminals, and wherein said telephonic communication system includes the capability of providing call data signals, said method comprising the steps of:

receiving said call data signals from said telephonic communications system for said remote terminals calling to interface said data processing system including DNIS automatically provided by said telephonic communication system;

selecting for said remote terminals, a select processing format from said plurality of formats of said multiple port, multiple format data processing system under control of said call data signals including DNIS provided by said telephonic communication system;

testing said select processing format in relation to said call data signals;

conditionally interfacing said selected processing format to said remote terminals;

selectively terminating certain select calls from said remote terminals in favor of said operator attended terminals; and

transferring substantially all of said certain select calls from said operator attended terminals back to said multiple port, multiple format data processing system.

21. A method for interfacing a telephonic communication system according to claim **19**, wherein said conditionally interfacing step further comprises the step of:

interfacing said selected processing format to said remote terminals based upon data entered by operators at said live operator attended terminals.

22. A method for interfacing a telephonic communication system according to claim **19**, further comprising the step of:

providing signal-represented call data from said remote terminals including calling numbers as additional call data signals.

23. A method for interfacing a telephonic communication system according to claim **22**, further comprising the step of:

providing said additional call data signals automatically from said telephone communication system (e.g. ANI).

24. A method for interfacing a telephonic communication system according to claim **22**, further comprising the steps of:

storing a record of negative file data, said select processing format using said additional call data signals to access said record and obtain data to specify and test for negative file conditions; and

terminating calls from said remote terminals if said calling number matches said data obtained from said negative file data.

25. A method for interfacing a telephonic communication system according to claim **22**, further comprising the step of:

storing a record of positive file data, said select processing format accessing said record based on said additional call data and obtaining data to specify and test for positive file conditions.

26. A method for interfacing a telephonic communication system according to claim **25**, further comprising the step of:

terminating calls from said remote terminals if said data to specify and test for positive file conditions is not located.

27. A method for interfacing a telephonic communication system according to claim **25**, further comprising the step of:

recording terms of caller billing associated with said select processing format.

28. A method for interfacing a telephonic communication system according to claim **19**, wherein a plurality of called numbers are associated with said select processing format.

29. A method for interfacing a telephonic communication system according to claim **19**, further comprising the step of:

testing to limit access to said select processing format on a one-time only basis.

30. A method for interfacing (1) a telephonic communication system including remote terminals for individual callers to make individual calls with (2) a multiple port, multiple format data processing system, said multiple port, multiple format data processing system for concurrently processing data from said remote terminals according to a plurality of formats, at least one of said formats having at least one condition for said remote terminals calling to interface said data processing system, and (3) a plurality of live operator attended terminals, and wherein said telephonic communication system provides call data signals, said method comprising the steps of:

receiving said call data signals from said telephonic communications system for said remote terminals indicative of DNIS automatically provided by said telephonic communication system;

selecting a select processing format from said plurality of formats of said multiple port, multiple format processing system under control of said call data signals;

testing said select processing format in relation to said call data signals to provide approval signals;

conditionally interfacing said select processing format to said remote terminals under control of said approval signals and said call data signals; and

storing data relating to said individual calls, along with any pay to dial billing data responsive to said call data signals.

31. A method for interfacing a telephonic communication system according to claim **30**, further comprising the step of:

providing signal-represented call data from said remote terminals including calling numbers as additional call data signals.

32. A method for interfacing a telephonic communication system according to claim **31**, further comprising the step of:

providing said additional call data signals automatically from said telephonic communication system (e.g. ANI).

33. A method for interfacing a telephonic communication system according to claim **32**, further comprising the step of:

selectively extracting said pay to dial billing data.

34. A method for interfacing a telephonic communication system including remote terminals for individual callers to make individual calls with a multiple port, multiple format data processing system and a plurality of live operator attended terminals, said multiple port, multiple format data processing system for concurrently processing data from said remote terminals according to a plurality of formats, at least one of said formats having at least one condition for said remote terminals calling to interface said data processing system, and wherein said telephonic communication system provides certain call data signals, said method comprising the steps of:

receiving said certain call data signals from said telephonic communications system for said remote terminals calling to interface said data processing system including DNIS automatically provided by said telephonic communication system;

selecting for said remote terminals, a specific pay to dial processing format from said plurality of formats of said multiple port, multiple format processing system under control of said call data signals including DNIS;

testing said specific pay to dial processing format in relation to additional call data signals indicative of caller telephone number to provide approval signals; and

conditionally interfacing said specific pay to dial processing format to said remote terminals under control of said approval signals.

35. A method for interfacing a telephonic communication system according to claim **34**, wherein said certain call data signals automatically provided by said telephonic communication facility include equipment data.

36. A method for interfacing a telephonic communication system according to claim **35**, further comprising the step of:

automatically providing calling numbers (e.g. ANI) from said telephonic communication system as additional call data signals.

37. A method for interfacing a telephonic communication system according to claim **36**, further comprising the step of:

testing said calling numbers (e.g. ANI) to specify use history conditions relating to said specific pay to dial processing format, for each of said individual calling terminals.

38. A method for interfacing a telephonic communication system according to claim **34**, further comprising the step of:

testing to limit access of said remote terminals to a one time only use.

39. A method for interfacing a telephonic communication system according to claim **36**, further comprising the steps of:

storing a record of negative file data, said specific pay to dial processing format accessing said record utilizing said automatically provided calling number data and obtaining data to specify and test for negative file conditions; and

terminating calls from said remote terminals if said calling number matches said data obtained from said negative file data.

40. A method for interfacing a telephonic communication system according to claim **39**, wherein said test for negative file conditions is controlled by said calling numbers (e.g. ANI) automatically provided from said telephonic communication system as additional call data signals.

41. A method for interfacing a telephonic communication system according to claim **34**, further comprising the steps of:

storing a record of positive file data, said specific pay to dial processing format accessing said record utilizing said caller telephone number data and obtaining data to specify and test for positive file conditions.

42. A method for interfacing a telephonic communication system according to claim **41**, wherein said test for positive file conditions is controlled by calling numbers (e.g. ANI) automatically provided from said telephonic communication system as additional call data signals.

43. A method for interfacing a telephonic communication according to claim **34**, further comprising the step of:

processing certain select of said remote terminals calling to interface said multiple port, multiple format data processing system based on said call data signals to connect said remote terminals to one of said plurality of live operator attended terminals.

44. A method for interfacing a telephonic communication according to claim **43**, further comprising the step of:

automatically connecting certain of said remote terminals to certain of said plurality of live operator attended terminals where said individual callers are appropriately prompted.

45. A method for interfacing a telephonic communication according to claim **34**, wherein said testing step further comprises the step of:

executing a test based on historical limitations applied to an individual format and utilizing DNIS to control said test.

46. A method for interfacing a telephonic communication system including remote terminals with a multiple port, multiple format data processing system, said multiple port, multiple format data processing system for concurrently processing data from said remote terminals according to a plurality of formats, at least one of said formats having at least one imposed condition for said remote terminals calling to interface said data processing system, and wherein said telephonic communication system automatically provides call data signals, said method comprising the steps of:

receiving said call data signals from said telephonic communications system for said remote terminals including call data signals indicative of DNIS automatically provided by said telephonic communication system;

selecting for said remote terminals, a select processing format from said plurality of formats of said multiple port, multiple format processing system under control of said call data signals;

testing the select processing format in relation to said call data signals to limit access by said remote terminals to a one time use; and

conditionally interfacing said select processing format to said remote terminals responsive to said testing step.

47. A method for interfacing a telephonic communication system according to claim **46**, further comprising the step of:

automatically providing calling numbers from said telephone communication system (e.g. ANI) as additional call data signals.

48. A method for interfacing a telephonic communication system including remote terminals with a multiple port, multiple format data processing system, said multiple port, multiple format data processing system for concurrently processing data from said remote terminals according to a plurality of formats, at least one of said formats having at least one imposed condition for said remote terminals calling to interface said data processing system, and wherein said telephonic communication system provides call data signals, said method comprising the steps of:

receiving said call data signals from said telephonic communications system for said remote terminals including DNIS and ANI automatically provided by said telephonic communication system;

selecting a pay to dial processing format from said plurality of formats of said multiple port, multiple format processing system under control of said call data signals including DNIS;

testing said pay to dial processing format in relation to said call data signals to provide test result signals;

conditionally interfacing said pay to dial processing format to said remote terminals responsive to said test result signals; and

storing billing provision data for each individual calling terminal based on said call data signals.

49. An interface control system for use with, (1) a communication facility including remote terminals for individual callers, wherein said remote terminals may comprise a conventional telephone instrument including voice communication means and digital input means for providing data, and (2) a multiple port, multiple format processor for concurrently processing data from a substantial number of callers in any of a plurality of formats, and (3) a plurality of live operator attended terminals with prompting capability for a plurality of formats, said interface control system comprising:

call data means for receiving signal-represented call data from said remote terminals including DNIS automatically provided by said telephonic communication system;

selection means coupled to said call data means for selecting one format from said plurality of formats of said multiple port, multiple format processor, said selection means being controlled by said signal-represented call data including DNIS to specify imposed conditions that must exist for a connection to said multiple port, multiple format processor, at least one of said formats having at least one imposed condition;

test means coupled to said selection means for testing said specified imposed conditions for said remote terminals to provide approval signals;

interconnect switch means coupled to said test means for providing connections from said multiple port, multiple format processor to said remote terminals under control of said approval signals; and

switch means coupled to said interconnect switch for switching to one of said live operator attended terminals based on call data representative of a remote terminal device.

50. A system according to claim **49**, further comprising:

switch means for switching calls from said live operator attended terminal back to said multiple format processor for automated processing.

51. An interface control system for use with, (1) a telephonic communication facility including remote terminals for individual callers, wherein said remote terminals may comprise a conventional telephone instrument including voice communication means and digital input means for providing data, and (2) a multiple port, multiple format processor for concurrently processing data from a substantial number of callers in any of a plurality of formats, said interface control system comprising:

call data means for receiving signal-represented call data from said remote terminals indicative of DNIS automatically provided by said telephonic communication facility;

selection means coupled to said call data means for selecting one pay to dial format from said plurality of formats of said multiple port, multiple format processor, said selection means being controlled by said signal-represented call data to specify imposed conditions that must exist for a connection to said multiple port, multiple format processor, at least one of said formats having at least one imposed condition;

test means coupled to said selection means for testing said imposed conditions to provide approval signals;

interconnect switch means coupled to said test means for providing connections from said multiple port, multiple format processor to said remote terminals under control of said approval signals; and

record means for storing data representative of calls from said individual callers and pay to dial individual caller billing data, under the control of said signal-represented call data.

52. A method for interfacing a telephonic communication system according to claim **51**, further comprising the step of:

automatically providing calling numbers from said telephone communication system (e.g. ANI) as additional call data signals.

53. An interface control system according to claim **51**, wherein said individual caller billing data is based on a control word for each operating format which imposes the terms of said caller billing data.

54. An interface control system for use with, (1) a telephonic communication facility including remote terminals for individual callers, wherein said remote terminals may comprise a conventional telephone instrument including voice communication means and digital input means for providing data, and (2) a multiple port, multiple format processor for concurrently processing data from a substantial number of callers in any of a plurality of formats, said telephonic communication facility automatically provides call data signals, as to indicate called numbers to select a particular format from said plurality of formats, and (3) a plurality of live operator attended terminals with prompting capability for a plurality of formats, said interface control system comprising:

interface means for providing an introductory automated voice message relating to a specific format from said plurality of formats;

means for forwarding coupled to said interface means for forwarding a call from any one of said remote terminals to one of said plurality of live operator attended terminals;

means for processing coupled to said forwarding means for processing caller information data entered by an operator at said live operator attended terminal;

means for storing coupled to said processing means for storing certain select data from said caller information data entered by said operator; and

means for reconnecting said call to said interface means to receive certain processed data via an automated voice message.

55. An interface control system according to claim **54**, wherein said call data signals automatically provided by said telephonic communication facility include data representative of said remote terminals.

56. An interface control system according to claim **55**, wherein said automatically provided call data signals indicating called numbers and data representative of said remote terminals forward said call automatically to one of said plurality of live operator attended terminals.

57. An interface control system according to claim **54**, wherein certain of said individual callers digitally enter data.

58. An interface control system according to claim **57**, wherein said data entered by said individual callers is stored in said interface control system.

59. An interface control system according to claim **54**, further comprising:

test structure to specify test conditions against which said caller information data entered by said operators is tested to provide approval signals and said call is interfaced with said specific format depending upon said approval signals.

60. An interface control system according to claim **59**, wherein said test structure executes a test based on the history of said remote terminal.

61. An interface control system according to claim **54**, wherein a plurality of called numbers are associated with said select processing format.

62. A method for interfacing a telephonic communication system including individual remote calling terminals for individual callers to make individual calls with a multiple port, multiple format data processing system and a plurality of live operator attended terminals, said multiple port, multiple format data processing system for concurrently processing data from said remote terminals according to a plurality of formats, at least one of said formats having at least one condition for said remote terminals calling to interface said data processing system, and wherein said telephonic communication system automatically provides call data signals, said method comprising the steps of:

receiving said call data signals from said telephonic communications system for said remote terminals calling to interface said data processing system indicative of DNIS automatically provided by said telephonic communication system;

selecting for said remote calling terminals, a select processing format from said plurality of formats of said multiple port, multiple format processing system under control of said call data signals, said plurality of formats including pay to dial processing formats;

testing use history conditions for said remote calling terminals when said select processing format is a pay to dial processing format to provide approval signals; and

conditionally interfacing said pay to dial processing format to said remote terminals under control of said approval signals.

63. A method for interfacing a telephonic communication system according to claim **62**, wherein said automatically provided call data signals further indicate information indicative of said remote terminal devices.

64. A method for interfacing a telephonic communication system according to claim **62**, wherein said testing step comprises the step of testing use history conditions for said remote calling terminals only for certain of said pay to dial processing formats.

65. An interface control system for use with, (1) a communication facility including remote terminals for individual callers to make calls, wherein said remote terminals may comprise a conventional telephone instrument including voice communication means and some of said remote terminals may further comprise digital input means for providing data, and (2) a multiple port, multiple format processor for concurrently processing data from a substantial number of callers in any of a plurality of formats, said communication facility automatically provides call data signals with respect to pay to dial formats, as to indicate called data (DNIS) including equipment data, to select a particular format from said plurality of formats, and (3) a plurality of live operator attended terminals with prompting capability, for a plurality of formats, said interface control system comprising:

interface means for providing automated voice messages relating to a specific format to certain of said individual callers, wherein said certain of said individual callers digitally enter data through said digital input means;

means for directly forwarding a call coupled to said interface means for forwarding a call from any one of said remote terminals to one of said plurality of live operator attended terminals under control of said call data signals when said remote terminals do not have capability to digitally provide data;

means for processing coupled to said live operator attended terminals for processing caller information data entered by an operator at said live operator attended terminal; and

means for storing coupled to said interface means and said processing means for storing certain select data from said caller information data entered by said operator and data entered digitally by said individual callers.

66. An interface control system according to claim **65**, wherein one of said pay to dial formats comprises a 900 number calling format.

67. A method for interfacing a telephonic communication system including remote terminals with a multiple port, multiple format data processing system, said multiple port, multiple format data processing system for concurrently processing data from said remote terminals according to a plurality of formats, at least one of said formats having at least one condition for said remote terminals calling to interface said data processing system, and wherein said telephonic communication system provides call data signals indicating called (e.g. DNIS) and calling (e.g. ANI) numbers, said method comprising the steps of:

receiving said call data signals from said telephonic communications system for said remote terminals indicative of DNIS and ANI automatically provided by said telephonic communication system;

selecting a pay to dial processing format from said plurality of formats of said multiple port, multiple format processing system under control of certain of said call data signals;

testing said pay to dial processing format in relation to said call data signals to provide test result signals;

conditionally interfacing said pay to dial processing format to said remote terminals responsive to said test result signals; and

storing billing provision data for each individual calling terminal based on said call data signals.

* * * * *